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THE UNIVERSITY OF ALBERTA

THE NEARCTIC SPECIES OF NEBRIA LATREILLE

(COLEOPTERA: CARABIDAE: NEBRIINI):

CLASSIFICATION, PHYLOGENY, ZOOGEOGRAPHY, AND NATURAL HISTORY

by



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TABLE OF CONTENTS

VOLUME 2

4.2 Zoogeography	522
4.21 Introduction	522
4.22 Contemporary zoogeography: present patterns of distribution	523
4.221 Generic, lineage, and species group patterns	523
4.222 Present distributions of Nearctic species and their relatives	526
4.223 <u>Nebria</u> fossils and past distributions	595
4.224 Habitat distributions; altitudinal zonation patterns	597
4.225 Range size, disjunction, and dispersal	602
4.226 Relationship between life cycle timing and distribution	605
4.23 Historical zoogeography	608
4.3 Compatibility between proposed phylogeny and historical zoogeography	610
4.4 Evolutionary trends	611
5.0 PROSPECTUS	612
5.1 Geographical distributions and undescribed taxa	612
5.2 Future directions in <u>Nebria</u> research	614
LITERATURE CITED	618
APPENDIX A. DISPOSITION OF PRIMARY TYPES OF NEARCTIC <u>NEBRIA</u> . .	661
APPENDIX B. MATERIAL EXAMINED	668
APPENDIX C. MATERIAL STUDIED FOR EX-GROUP COMPARISONS	838

AUTOBIOGRAPHY 842

FIGURES 844

LIST OF TABLES

VOLUME 2

Table 16.	Total number of species and subspecies, "approximate landmass units" (LU), "average landmass 5° interval values" (ALIV), and "total interval values" (TIV) derived from Fig. 422	528
Table 17.	Frequency distribution of maximum linear extent of geographical range in kilometers for Nearctic <u>Nebria</u> species and subspecies (based on data from Table 12	535
Table 18.	Measure of <u>Nebria</u> faunal similarities among montane regions (as classified in Table 1): data matrix, Simpson coefficients	541
Table 19.	Measure of <u>Nebria</u> faunal similarities among montane regions (as classified in Table 1): data matrix, Jaccard coefficients	544
Table 20.	Measure of <u>Nebria</u> faunal similarities among mountain ranges of the central and southern Pacific Coast region: data matrix, Simpson coefficients	548
Table 21.	Measure of <u>Nebria</u> faunal similarities among mountain ranges of the central and southern Pacific Coast region: data matrix, Jaccard coefficients	550
Table 22.	Measure of <u>Nebria</u> faunal similarities among mountain ranges of the central and southern Rocky Mountain regions: data matrix, Simpson coefficients	554

Table 23.	Measure of <u>Nebria</u> faunal similarities among mountain ranges of the central and southern Rocky Mountain regions: data matrix, Jaccard coefficients	555
Table 24.	<u>Nebria</u> species and subspecies shared between different Nearctic faunas and between Nearctic and Palaearctic faunas	574
Table 25.	Data on vicariance relationships among Nearctic <u>Nebria</u> subspecies	579
Table 26.	Data on vicariance relationships among Nearctic <u>Nebria</u> sister species	587

LIST OF FIGURES

VOLUME 2

Fig. 1.	Components of "standardized body length"	846
Fig. 2.	Habitus: general body form, type aile	846
Fig. 3.	Habitus: general body form, type aptere	846
Fig. 4.	Generalized head, with paired frontal red spots . . .	846
Fig. 5.	Generalized head, with fused frontal red spots	846
Fig. 6.	Generalized head, with fused frontal red spots, M-shaped	846
Fig. 7.	Elytral microsculpture, <u>Nebria darlingtoni</u> new species	848
Fig. 8.	Elytral microsculpture, <u>Nebria diversa</u> LeConte	848
Fig. 9.	Elytral microsculpture, <u>Nebria appalachia</u> Darlington .	848
Fig. 10.	Elytral microsculpture, <u>Nebria hudsonica</u> LeConte . . .	848
Fig. 11.	Elytral microsculpture, <u>Nebria gregaria</u> Fischer von Waldheim	848
Fig. 12.	Elytral microsculpture, <u>Nebria lacustris lacustris</u> . .	848
Fig. 13.	Head, <u>Nebria crassicornis crassicornis</u> Van Dyke . . .	850
Fig. 14.	Head, <u>Nebria crassicornis intermedia</u> Van Dyke	850
Fig. 14A.	Head, <u>Nebria gyllenhali castanipes</u> (Kirby)	850
Fig. 15.	Head, <u>Nebria gregaria</u> Fischer von Waldheim	850
Fig. 16.	Head, <u>Nebria charlottae</u> Lindroth	850
Fig. 17.	Head, <u>Nebria appalachia</u> Darlington	850
Fig. 18.	Head, <u>Nebria gebleri gebleri</u> Dejean	850
Fig. 19.	Head, <u>Nebria ovipennis</u> LeConte	850
Fig. 20.	Head, <u>Nebria spatulata spatulata</u> Van Dyke	850
Fig. 21.	Head, <u>Nebria metallica</u> Fischer von Waldheim	850

Fig. 22.	Head, <u>Nebria ingens ingens</u> Horn	852
Fig. 23.	Relative measure of antenna length	852
Fig. 24.	Antennal scape, <u>Nebria gouleti</u> new species	852
Fig. 25.	Antennal scape, <u>Nebria hudsonica</u> LeConte	852
Fig. 26.	Antennal scape, <u>Nebria gyllenhali castanipes</u> (Kirby) .	852
Fig. 27.	Antennal scape, <u>Nebria gyllenhali lassenensis</u> new subspecies	852
Fig. 28.	Antennal scape, <u>Nebria gyllenhali lindrothi</u> new subspecies	852
Fig. 29.	Antennal scape, <u>Nebria lyelli</u> Van Dyke	852
Fig. 30.	Antennal scape, <u>Nebria arkansana uinta</u> new subspecies	852
Fig. 31.	Antennal scape, <u>Nebria zioni zioni</u> Van Dyke	852
Fig. 32.	Antennal scape, <u>Nebria zioni oasis</u> new subspecies . .	852
Fig. 33.	Antennal scape, <u>Nebria ovipennis</u> LeConte	852
Fig. 34.	Antennal scape, <u>Nebria spatulata spatulata</u> Van Dyke .	852
Fig. 35.	Antennal scape, <u>Nebria spatulata sierrae</u> new subspecies	852
Fig. 36.	Antennal scape, <u>Nebria vandykei vandykei</u> Banninger . .	852
Fig. 37.	Antennal scape, <u>Nebria vandykei wyeast</u> new subspecies	852
Fig. 38.	Antennal scape, <u>Nebria trifaria trifaria</u> LeConte . . .	852
Fig. 39.	Antennal scape, <u>Nebria trifaria catenata</u> Casey	854
Fig. 40.	Antennal scape, <u>Nebria coloradensis</u> Van Dyke	854
Fig. 41.	Antennal scape, <u>Nebria piute</u> Erwin and Ball	854
Fig. 42.	Basal antennomeres, <u>Nebria purpurata</u> LeConte	854
Fig. 43.	Basal antennomeres, <u>Nebria ingens ingens</u> Horn	854

Fig. 44.	Basal antennomeres, <u>Nebria virescens</u> Horn	854
Fig. 45.	Antennal pedicel, <u>Nebria virescens</u> Horn	854
Fig. 46.	Antennal pedicel, <u>Nebria nivalis nivalis</u> (Paykull)	854
Fig. 47.	Antennal pedicel, <u>Nebria nivalis nivalis</u> (Paykull)	854
Fig. 48.	Clypeus, <u>Nebria desolata</u> Kavanaugh	854
Fig. 49.	Clypeus, <u>Nebria hudsonica</u> LeConte	854
Fig. 50.	Labrum, <u>Nebria pallipes</u> Say	854
Fig. 51.	Labrum, <u>Nebria hudsonica</u> LeConte	854
Fig. 52.	Labrum, <u>Nebria ingens ingens</u> Horn	854
Fig. 53.	Labrum, <u>Nebria gregaria</u> Fischer von Waldheim	854
Fig. 54.	Left mandible, <u>Nebria virescens</u> Horne	856
Fig. 55.	Left mandible, <u>Nebria vandykei vandykei</u> Banninger	856
Fig. 56.	Left mandible, <u>Nebria nitidula</u> (Fabricius)	856
Fig. 57.	Right mandible, <u>Nebria virescens</u> Horn	856
Fig. 58.	Right mandible, <u>Nebria nitidula</u> (Fabricius)	856
Fig. 59.	Right mandible, <u>Nebria appalachia</u> Darlington	858
Fig. 60.	Right maxilla, <u>Nebria brevicollis</u> (Fabricius)	858
Fig. 61.	Labium, <u>Nebria virescens</u> Horn	858
Fig. 62.	Labium, <u>Nebria hudsonica</u> LeConte	858
Fig. 63.	Labium, <u>Nebria ingens ingens</u> Horn	858
Fig. 64.	Mentum, general form and position of setae	858
Fig. 65.	Mentum, <u>Nebria hudsonica</u> LeConte	858
Fig. 66.	Mentum, <u>Nebria lyelli</u> Van Dyke	860
Fig. 67.	Mentum, <u>Nebria gregaria</u> Fischer von Waldheim	860
Fig. 68.	Mentum, <u>Nebria charlottae</u> Lindroth	860
Fig. 69.	Mentum, <u>Nebria obliqua</u> LeConte	860
Fig. 70.	Mentum, <u>Nebria mannerheimii</u> Fischer von Waldheim	860

Fig. 71.	Mentum, <u>Nebria desolata</u> Kavanaugh	860
Fig. 72.	Mentum, <u>Nebria carri</u> new species	860
Fig. 73.	Mentum, <u>Nebria kincaidi kincaidi</u> Schwarz	860
Fig. 74.	Mentum, <u>Nebria spatulata spatulata</u> Van Dyke	860
Fig. 75.	Mentum, <u>Nebria ovipennis</u> LeConte	860
Fig. 76.	Mentum, <u>Nebria ingens ingens</u> Horn	862
Fig. 77.	Mentum, <u>Nebria trifaria trifaria</u> LeConte	862
Fig. 78.	Mentum, <u>Nebria trifaria catenata</u> Casey	862
Fig. 79.	Gula, general form and position of setae	862
Fig. 80.	Gula, <u>Nebria zioni zioni</u> Van Dyke	862
Fig. 81.	Gula, <u>Nebria purpurata</u> LeConte	862
Fig. 82.	Pronotum, general form and associated terms	864
Fig. 83.	Pronotum, general form and associated terms	864
Fig. 84.	Pronotum, <u>Nebria virescens</u> Horn	864
Fig. 85.	Pronotum, <u>Nebria chalceola</u> Bates	864
Fig. 86.	Pronotum, <u>Nebria paradisi</u> Darlington	864
Fig. 87.	Pronotum, <u>Nebria lacustris lacustris</u> Casey	866
Fig. 88.	Pronotum, <u>Nebria lacustris bellorum</u> new subspecies . .	866
Fig. 89.	Pronotum, <u>Nebria nivalis nivalis</u> (Paykull)	866
Fig. 90.	Pronotum, <u>Nebria nivalis gaspesiana</u> new subspecies . .	866
Fig. 91.	Pronotum, fossil specimen, <u>nivalis</u> subgroup	866
Fig. 92.	Pronotum, <u>Nebria crassicornis crassicornis</u> Van Dyke .	866
Fig. 93.	Pronotum, <u>Nebria crassicornis intermedia</u> Van Dyke . .	866
Fig. 93A.	Pronotum, <u>Nebria gyllenhali castanipes</u> (Kirby)	868
Fig. 93B.	Pronotum, <u>Nebria gyllenhali lindrothi</u> new subspecies .	868
Fig. 94.	Pronotum, <u>Nebria lyelli</u> Van Dyke	868
Fig. 95.	Pronotum, <u>Nebria acuta acuta</u> Lindroth	868

Fig. 96.	Pronotum, <u>Nebria acuta quileute</u> new subspecies	868
Fig. 97.	Pronotum, <u>Nebria sahlbergii modoc</u> new subspecies . . .	868
Fig. 98.	Pronotum, <u>Nebria sahlbergii triad</u> new subspecies . . .	868
Fig. 99.	Pronotum, <u>Nebria zioni zioni</u> Van Dyke	868
Fig. 100.	Pronotum, <u>Nebria suturalis</u> LeConte	868
Fig. 101.	Pronotum, <u>Nebria obliqua</u> LeConte	870
Fig. 102.	Pronotum, <u>Nebria appalachia</u> Darlington	870
Fig. 103.	Pronotum, <u>Nebria pallipes</u> Say	870
Fig. 104.	Pronotum, <u>Nebria darlingtoni</u> new species	870
Fig. 105.	Pronotum, <u>Nebria mannerheimii</u>	870
Fig. 106.	Pronotum, <u>Nebria desolata</u> Kavanaugh	870
Fig. 107.	Pronotum, <u>Nebria gebleri gebleri</u> Dejean	870
Fig. 108.	Pronotum, <u>Nebria gebleri cascadiensis</u> new subspecies .	872
Fig. 109	Pronotum, <u>Nebria gebleri rathvoni</u> LeConte	872
Fig. 110.	Pronotum, <u>Nebria gebleri siskiyouensis</u> new subspecies	872
Fig. 110A.	Pronotum, <u>Nebria gebleri strawberriensis</u> new subspecies	872
Fig. 111.	Pronotum, <u>Nebria carri</u> new species	872
Fig. 112.	Pronotum, <u>Nebria kincaidi kincaidi</u> Schwarz	872
Fig. 113.	Pronotum, <u>Nebria meanyi meanyi</u> Van Dyke	872
Fig. 114.	Pronotum, <u>Nebria meanyi lamarckensis</u> new subspecies .	872
Fig. 115.	Pronotum, <u>Nebria meanyi sylvatica</u> new subspecies . . .	874
Fig. 116.	Pronotum, <u>Nebria metallica</u> Fischer von Waldheim . . .	874
Fig. 117.	Pronotum, <u>Nebria ingens ingens</u> Horn	874
Fig. 118.	Pronotum, <u>Nebria piperi</u> Van Dyke	874
Fig. 119.	Pronotum, <u>Nebria schwarzi schwarzi</u> Van Dyke	876

Fig. 120.	Pronotum, <u>Nebria</u> <u>schwarzi</u> <u>beverlianna</u> new subspecies .	876
Fig. 120A.	Pronotum, <u>Nebria</u> <u>purpurata</u> LeConte	876
Fig. 121.	Pronotum, <u>Nebria</u> <u>trifaria</u> <u>trifaria</u> LeConte	876
Fig. 121A.	Pronotum, <u>Nebria</u> <u>trifaria</u> <u>utahensis</u> new subspecies . .	876
Fig. 122.	Pronotum, <u>Nebria</u> <u>coloradensis</u> Van Dyke	878
Fig. 123.	Prothoracic venter, <u>Nebria</u> <u>gouleti</u> new species	878
Fig. 124.	Prothoracic venter, <u>Nebria</u> <u>sahlbergii</u> <u>modoc</u> new subspecies	878
Fig. 125.	Prosternal intercoxal process, <u>Nebria</u> <u>brevicollis</u> (Fabricius)	878
Fig. 125A.	Prosternal intercoxal process, <u>Nebria</u> <u>piperi</u> Van Dyke	878
Fig. 126.	Prosternal intercoxal process, <u>Nebria</u> <u>fragilis</u> <u>fragilis</u> Casey	878
Fig. 127.	Prosternal intercoxal process, <u>Nebria</u> <u>appalachia</u> Darlington	878
Fig. 128.	Prosternal intercoxal process, <u>Nebria</u> <u>charlottae</u> Lindroth	878
Fig. 129.	Prosternal intercoxal process, <u>Nebria</u> <u>gregaria</u> Fischer von Waldheim	878
Fig. 130.	Prosternal intercoxal process, <u>Nebria</u> <u>ingens</u> <u>riversi</u> Van Dyke	878
Fig. 131.	Prosternal intercoxal process, <u>Nebria</u> <u>purpurata</u> LeConte	878
Fig. 132.	Prosternal intercoxal process, <u>Nebria</u> <u>arkansana</u> <u>uinta</u> new subspecies	878
Fig. 133.	Front coxal cavities, <u>Nebria</u> <u>brevicollis</u> (Fabricius) .	880

Fig. 134.	Front coxal cavities, <u>Nebria brevicollis</u> (Fabricius) .	880
Fig. 135.	Elytral silhouette, generalized rectangular	880
Fig. 136.	Elytral silhouette, generalized subrectangular	880
Fig. 137.	Elytral silhouette, generalized subovoid	880
Fig. 138.	Elytral silhouette, generalized subovoid-narrowed . .	880
Fig. 139.	Elytral silhouette, generalized ovoid	880
Fig. 140.	Elytral silhouette, generalized tear-shaped	880
Fig. 141.	Elytral silhouette, <u>Nebria gregaria</u> Fischer von Waldheim	880
Fig. 142.	Elytral silhouette, <u>Nebria charlottae</u> Lindroth	880
Fig. 143.	Elytral silhouette, <u>Nebria desolata</u> Kavanaugh	880
Fig. 144.	Elytral silhouette, <u>Nebria piperi</u> Van Dyke	880
Fig. 145.	Elytral silhouette, <u>Nebria paradisi</u> Darlington	880
Fig. 146.	Elytra, general form and associated terms	882
Fig. 147.	Elytral base, <u>Nebria arkansana edwardsi</u>	882
Fig. 148.	Elytral base, <u>Nebria altaica</u> Gebler	882
Fig. 149.	Elytral base, <u>Nebria kincaidi kincaidi</u> Schwarz	882
Fig. 150.	Elytral base, <u>Nebria kincaidi balli</u> new subspecies . .	882
Fig. 151.	Elytral base, <u>Nebria meanyi meanyi</u> Van Dyke	882
Fig. 152.	Elytral base, <u>Nebria meanyi lamarckensis</u> new subspecies	882
Fig. 153.	Elytral base, <u>Nebria piperi</u> Van Dyke	882
Fig. 154.	Elytral base, <u>Nebria ingens ingens</u>	882
Fig. 155.	Left elytron, <u>Nebria virescens</u> Horn	884
Fig. 156.	Left elytron, <u>Nebria frigida</u> Sahlberg	884
Fig. 157.	Left elytron, <u>Nebria acuta acuta</u> Lindroth	884
Fig. 158.	Left elytron, <u>Nebria sahlbergii sahlbergii</u> Fischer	

von Waldheim	884
Fig. 159. Left elytron, <u>Nebria suturalis</u> LeConte	886
Fig. 160. Left elytron, <u>Nebria vandykei vandykei</u> Banninger . . .	886
Fig. 161. Left elytron, <u>Nebria schwarzi schwarzi</u> Van Dyke. . . .	886
Fig. 162. Elytral apices, <u>Nebria virescens</u> Horn	888
Fig. 163. Elytral apices, <u>Nebria chalceola</u> Bates	888
Fig. 164. Elytral apices, <u>Nebria paradisi</u> Darlington	888
Fig. 165. Elytral apices, <u>Nebria lacustris lacustris</u> Casey . . .	888
Fig. 166. Elytral apices, <u>Nebria pallipes</u> Say	888
Fig. 167. Elytral apices, <u>Nebria meanyi meanyi</u> Van Dyke	888
Fig. 168. Elytral apices, <u>Nebria schwarzi schwarzi</u> Van Dyke . .	888
Fig. 169. Internal plica, <u>Nebria hudsonica</u> LeConte	890
Fig. 170. Internal plica, <u>Nebria hudsonica</u> LeConte	890
Fig. 171. Elytral base, <u>Nebria gouletti</u> new species	890
Fig. 172. Elytral base, <u>Nebria metallica</u> Fischer von Waldheim .	890
Fig. 173. Elytral base, <u>Nebria trifaria trifaria</u> LeConte . . .	890
Fig. 174. Elytral base, <u>Pterostichus adstrictus</u> Eschscholtz . .	890
Fig. 175. Elytral base, <u>Amara insignis</u> Dejean	890
Fig. 176. Elytral base, <u>Agonum maculicolle</u> Dejean	890
Fig. 177. Elytral base, <u>Patrobus longicornis</u> Say	890
Fig. 178. Elytral fragments, fossil specimens, <u>Nebria nivalis</u> (Paykull)	892
Fig. 179. Elytral fragments, fossil specimens, <u>Nebria lacustris</u> Casey or <u>Nebria pallipes</u> Say	892
Fig. 180. Elytral fragments, fossil specimens, <u>Nebria suturalis</u> LeConte	894
Fig. 181. Hindwing (metathoracic wing), general form and	

	associated terms	896
Fig. 182.	Hindwing, <u>Nebria virescens</u> Horn	896
Fig. 183.	Hindwing, <u>Nebria appalachia</u> Darlington	896
Fig. 184.	Hindwing, <u>Nebria coloradensis</u> Van Dyke	896
Fig. 185.	Hindwing, <u>Nebria charlottae</u> Lindroth	896
Fig. 186.	Hindwing, <u>Nebria gregaria</u> Fischer von Waldheim	898
Fig. 187.	Hindwing, <u>Nebria purpurata</u> LeConte	898
Fig. 188.	Hindwing, <u>Nebria fragilis fragilis</u> Casey	898
Fig. 189.	Hindwing, <u>Nebria lyelli</u> Van Dyke	898
Fig. 190.	Hindwing, <u>Nebria spatulata sierrae</u> new subspecies . .	898
Fig. 191.	Hindwing, <u>Nebria gyllenhali castanipes</u> (Kirby)	898
Fig. 192.	Hindwing, <u>Nebria gyllenhali lindrothi</u> new subspecies .	898
Fig. 193.	Hindwing, <u>Nebria arkansana arkansana</u> Casey	900
Fig. 194.	Hindwing, <u>Nebria arkansana uinta</u> new subspecies . . .	900
Fig. 195.	Hindwing, <u>Nebria navajo</u> new species	900
Fig. 196.	Hindwing, <u>Nebria trifaria utahensis</u> new subspecies .	900
Fig. 197.	Oblongum cell, <u>Nebria frigida</u> Sahlberg	902
Fig. 198.	Oblongum cell, <u>Nebria trifaria catenata</u> Casey	902
Fig. 199.	Oblongum cell, <u>Nebria hudsonica</u> LeConte	902
Fig. 200.	Oblongum cell, <u>Nebria obliqua</u> LeConte	902
Fig. 201.	Wedge cell, <u>Nebria pallipes</u> Say	902
Fig. 202.	Wedge cell, <u>Nebria darlingtoni</u> new species	902
Fig. 203.	Wedge cell, <u>Nebria sahlbergii modoc</u> new subspecies . .	902
Fig. 204.	Wedge cell, <u>Nebria piperi</u> Van Dyke	902
Fig. 205.	Wedge cell, <u>Nebria schwarzi schwarzi</u> Van Dyke	902
Fig. 206.	Hindwing, <u>Trachypachus gibbsi</u> LeConte	904
Fig. 207.	Relative measure of metasternum length	904

Fig. 208.	Metasternum, <u>Nebria</u> <u>piperi</u> Van Dyke	904
Fig. 209.	Metasternum, <u>Nebria</u> <u>fragilis</u> <u>teewinot</u> new subspecies .	904
Fig. 210.	Metasternum, <u>Nebria</u> <u>kincaidi</u> <u>balli</u> new subspecies . .	904
Fig. 211.	Anterior intercoxal process of metasternum, <u>Nebria</u> <u>meanyi</u> <u>lamarckensis</u> new subspecies	906
Fig. 212.	Anterior intercoxal process of metasternum, <u>Nebria</u> <u>zion</u> <u>oasis</u> new subspecies	906
Fig. 213.	Anterior intercoxal process of metasternum, <u>Nebria</u> <u>brevicollis</u> (Fabricius)	906
Fig. 214.	Anterior intercoxal process of metasternum, <u>Nebria</u> <u>vi</u> <u>rescens</u> Horn	906
Fig. 215.	Metepisternum, <u>Nebria</u> <u>brevicollis</u> (Fabricius)	906
Fig. 216.	Metepisternum, <u>Nebria</u> <u>obliqua</u> LeConte	906
Fig. 217.	Hindleg, <u>Nebria</u> <u>crassicornis</u> <u>crassicornis</u> Van Dyke . .	906
Fig. 218.	Hindleg, <u>Nebria</u> <u>vandykei</u> <u>wyeast</u> new subspecies	906
Fig. 219.	Hindleg, <u>Nebria</u> <u>gouleti</u> new species	906
Fig. 220.	Front coxa, <u>Nebria</u> <u>obliqua</u> LeConte	906
Fig. 221.	Middle coxa, <u>Nebria</u> <u>obliqua</u> LeConte	906
Fig. 222.	Middle coxa, <u>Nebria</u> <u>metallica</u> Fischer von Waldheim . .	906
Fig. 223.	Hind coxa, <u>Pelophila</u> <u>borealis</u> (Paykull)	908
Fig. 224.	Hind coxa, <u>Nebria</u> <u>fragilis</u> <u>fragilis</u> Casey	908
Fig. 225.	Hind coxa, <u>Nebria</u> <u>vi</u> <u>rescens</u> Horn	908
Fig. 226.	Hind coxa, <u>Nebria</u> <u>schwarzi</u> <u>schwarzi</u> Van Dyke	908
Fig. 227.	Hind coxa, <u>Nebria</u> <u>schwarzi</u> <u>beverlianna</u> new subspecies	908
Fig. 228.	Hind coxa, <u>Nebria</u> <u>appalachia</u> Darlington	908
Fig. 229.	Hind coxa, <u>Nebria</u> <u>desolata</u> Kavanaugh	908

Fig. 230.	Front trochanter, <u>Nebria diversa</u> LeConte	908
Fig. 231.	Middle trochanter, <u>Nebria diversa</u> LeConte	908
Fig. 232.	Hind trochanter, <u>Nebria diversa</u> LeConte	908
Fig. 233.	Front femur, <u>Nebria brevicollis</u> (Fabricius)	910
Fig. 234.	Middle femur, <u>Nebria brevicollis</u> (Fabricius)	910
Fig. 235.	Hind femur, <u>Nebria brevicollis</u> (Fabricius)	910
Fig. 236.	Anterior tibia, <u>Nebria brevicollis</u> (Fabricius)	912
Fig. 237.	Middle tibia, <u>Nebria pallipes</u> Say	914
Fig. 238.	Middle tibia, <u>Nebria gouleti</u> new species	914
Fig. 239.	Middle tibia, <u>Nebria carri</u> new species	914
Fig. 240.	Middle tibia, <u>Nebria virescens</u> Horn	914
Fig. 241.	Front tarsus, <u>Nebria purpurata</u> LeConte, male	916
Fig. 242.	Front tarsus, <u>Nebria ingens ingens</u> Horn, male	916
Fig. 243.	Front tarsus, <u>Nebria ovipennis</u> LeConte, male	916
Fig. 244.	Hind tarsus, <u>Nebria purpurata</u> LeConte	918
Fig. 245.	Hind tarsus, <u>Nebria ingens ingens</u> Horn	918
Fig. 246.	Hind tarsus, <u>Nebria ovipennis</u> LeConte	918
Fig. 247.	Hind tarsus, <u>Nebria brevicollis</u> (Fabricius)	918
Fig. 248.	Hind tarsus, <u>Nebria eschscholtzii</u> Menetries	918
Fig. 249.	Fourth tarsomere, hind tarsus, <u>Nebria virescens</u> Horn .	920
Fig. 250.	Fourth tarsomere, hind tarsus, <u>Nebria arkansana</u> <u>edwardsi</u> new subspecies	920
Fig. 251.	Fourth tarsomere, hind tarsus, <u>Nebria nivalis</u> <u>gaspesiana</u> new subspecies	920
Fig. 252.	Fourth tarsomere, hind tarsus, <u>Nebria paradisi</u> Darlington	920
Fig. 253.	Abdominal sterna, <u>Nebria frigida</u> Sahlberg,	922

Fig. 254.	Abdominal sterna, <u>Nebria frigida</u> Sahlberg	922
Fig. 255.	Abdominal sterna, <u>Nebria hudsonica</u> LeConte, male	922
Fig. 256.	Anal sternum, <u>Nebria hudsonica</u> LeConte, female	922
Fig. 257.	Abdominal sterna, <u>Nebria appalachia</u> Darlington	922
Fig. 258.	Abdominal sterna, <u>Nebria vandykei</u> <u>wyeast</u> new subspecies, male	924
Fig. 259.	Anal sternum, <u>Nebria vandykei</u> <u>wyeast</u> new subspecies, female	924
Fig. 260.	Male genitalia, general form and associated terms	924
Fig. 261.	Orientation of male genitalic structures in in copulatory position	926
Fig. 262.	Median lobe, <u>Nebria virescens</u> Horn	926
Fig. 263.	Median lobe, <u>Nebria brevicollis</u> (Fabricius)	926
Fig. 264.	Median lobe, <u>Nebria paradisi</u> Darlington	926
Fig. 265.	Median lobe, <u>Nebria acuta acuta</u> Lindroth	926
Fig. 266.	Median lobe, <u>Nebria acuta quileute</u> new subspecies	926
Fig. 267.	Median lobe, <u>Nebria sahlbergii sahlbergii</u> Fischer von Waldheim	928
Fig. 268.	Median lobe, <u>Nebria arkansana edwardsi</u> new subspecies	928
Fig. 269.	Median lobe, <u>Nebria arkansana oowah</u> new subspecies	928
Fig. 270.	Median lobe, <u>Nebria arkansana uinta</u> new subspecies	928
Fig. 271.	Median lobe, <u>Nebria fragilis fragilis</u> Casey	928
Fig. 272.	Median lobe, <u>Nebria desolata</u> Kavanaugh	928
Fig. 273.	Median lobe, <u>Nebria navajo</u> new species	930
Fig. 274.	Median lobe, <u>Nebria eschscholtzii</u> Menetries	930
Fig. 275.	Median lobe, <u>Nebria gebleri gebleri</u> Dejean	930

Fig. 276.	Median lobe, <u>Nebria gebleri strawberriensis</u> new subspecies	930
Fig. 277.	Median lobe, <u>Nebria carri</u> new species	930
Fig. 278.	Median lobe, <u>Nebria kincaidi kincaidi</u> Schwarz	932
Fig. 279.	Median lobe, <u>Nebria spatulata sierrae</u> new subspecies	932
Fig. 280.	Median lobe, <u>Nebria ovipennis</u> LeConte	932
Fig. 281.	Median lobe, <u>Nebria trifaria trifaria</u> LeConte	932
Fig. 282.	Median lobe, <u>Nebria trifaria catenata</u> Casey	934
Fig. 283.	Median lobe, <u>Nebria trifaria utahensis</u> new subspecies	934
Fig. 284.	Median lobe, <u>Nebria coloradensis</u> Van Dyke	934
Fig. 285.	Median lobe, <u>Nebria piute</u> Erwin and Ball	934
Fig. 286.	Median lobe, <u>Nebria gouleti</u> new species	936
Fig. 287.	Median lobe, <u>Nebria zioni oasis</u> new subspecies	936
Fig. 288.	Internal sac of median lobe, <u>Nebria vandykei</u> <u>vandykei</u> Banninger	936
Fig. 289.	Internal sac of median lobe, <u>Nebria gyllenhali</u> <u>castanipes</u> (Kirby)	936
Fig. 290.	Right paramere, <u>Nebria virescens</u> Horn	938
Fig. 291.	Left paramere, <u>Nebria virescens</u> Horn	938
Fig. 291A.	Left paramere, <u>Nebria paradisi</u> Darlington	938
Fig. 292.	Right paramere, <u>Nebria gouleti</u> new species	938
Fig. 293.	Left paramere, <u>Nebria gouleti</u> new species	938
Fig. 294.	Parameres, <u>Nebria brevicollis</u> (Fabricius)	938
Fig. 295.	Left paramere, <u>Nebria ovipennis</u> LeConte	938
Fig. 296.	Right paramere, <u>Nebria schwarzi beverlianna</u> new subspecies	938

Fig. 297.	Ring sclerite in relation to median lobe	938
Fig. 298.	Ring sclerite in <u>Nebria</u> , generalized	938
Fig. 299.	Ring sclerite in <u>Amphizoa lecontei</u> Matthew	938
Fig. 300.	Eighth sternum, <u>Nebria virescens</u> Horn, female	940
Fig. 301.	Eighth sternum, <u>Nebria metallica</u> Fischer von Waldheim, female	940
Fig. 302.	Eighth sternum, <u>Nebria gouletti</u> new species, female . .	940
Fig. 303.	Eighth sternum, <u>Nebria paradisi</u> Darlington, female . .	940
Fig. 304.	Eighth sternum, <u>Nebria carri</u> new species, female . . .	940
Fig. 304A.	Eighth sternum, <u>Trachypachus gibbsi</u> LeConte	940
Fig. 305.	Proctiger and paraprocts, <u>Nebria virescens</u> Horn . . .	940
Fig. 306.	Proctiger and paraprocts, <u>Nebria diversa</u> LeConte . . .	940
Fig. 307.	Paraproct and valvifer, <u>Nebria arkansana edwardsi</u> new subspecies	940
Fig. 308.	Paraproct and valvifer, <u>Nebria virescens</u> Horn	940
Fig. 309.	Valvifer, <u>Nebria lacustris bellorum</u> new subspecies . .	940
Fig. 310.	Valvifer, <u>Nebria lyelli</u> Van Dyke	940
Fig. 311.	Valvifer, <u>Nebria gregaria</u> Fischer von Waldheim	940
Fig. 312.	Tenth sternum, <u>Nebria paradisi</u> Darlington	942
Fig. 313.	Tenth sternum, <u>Nebria suturalis</u> LeConte	942
Fig. 314.	Tenth sternum, <u>Amphizoa lecontei</u> Matthew	942
Fig. 315.	Coxostylus, <u>Nebria virescens</u> Horn	944
Fig. 316.	Coxostylus, <u>Nebria darlingtoni</u> new species	944
Fig. 317.	Coxostylus, <u>Nebria piperi</u> Van Dyke	944
Fig. 318.	Coxostylus, <u>Nebria gebleri gebleri</u> Dejean	944
Fig. 319.	Coxostylus, <u>Nebria gyllenhali castanipes</u> (Kirby) . . .	944
Fig. 320.	Coxostylus, <u>Nebria nivalis nivalis</u> (Paykull)	944

Fig. 321.	Coxostylus, <u>Nebria zioni zioni</u> Van Dyke	944
Fig. 322.	Bursa copulatrix, general form and associated terms .	946
Fig. 323.	Bursa copulatrix, general form and associated terms .	946
Fig. 324.	Bursa copulatrix, <u>Nebria virescens</u> Horn	946
Fig. 325.	Bursa copulatrix, <u>Nebria hudsonica</u> LeConte	946
Fig. 326.	Bursa copulatrix, <u>Nebria crassicornis crassicornis</u> Van Dyke	946
Fig. 327.	Bursa copulatrix, <u>Nebria frigida</u> Sahlberg	948
Fig. 328.	Bursa copulatrix, <u>Nebria acuta acuta</u> Lindroth	948
Fig. 329.	Bursa copulatrix, <u>Nebria acuta quileute</u> new subspecies	948
Fig. 329A.	Bursa copulatrix, <u>Nebria sahlbergii sahlbergii</u> Fischer von Waldheim	948
Fig. 330.	Bursa copulatrix, <u>Nebria sahlbergii modoc</u> new subspecies	948
Fig. 331.	Bursa copulatrix, <u>Nebria arkansana edwardsi</u> new subspecies	950
Fig. 332.	Bursa copulatrix, <u>Nebria arkansana oowah</u> new subspecies	950
Fig. 333.	Bursa copulatrix, <u>Nebria gebleri gebleri</u> Dejean . . .	952
Fig. 334.	Bursa copulatrix, <u>Nebria gebleri strawberriensis</u> . . .	952
Fig. 335.	Bursa copulatrix, <u>Nebria kincaidi kincaidi</u> Schwarz . .	952
Fig. 336.	Bursa copulatrix, <u>Nebria coloradensis</u> Van Dyke	952
Fig. 336A.	Bursa copulatrix, <u>Nebria piute</u> Erwin and Ball	952
Fig. 337.	Bursa copulatrix, <u>Nebria trifaria trifaria</u> LeConte . .	954
Fig. 338.	Bursa copulatrix, <u>Nebria trifaria catenata</u> Casey . . .	954
Fig. 339.	Bursa copulatrix, <u>Nebria trifaria utahensis</u> new	

subspecies	954
Fig. 340. Bursa copulatrix, <u>Nebria paradisi</u> Darlington	954
Fig. 341. Bursa copulatrix, <u>Nebria darlingtoni</u> new species	954
Fig. 342. Bursa copulatrix, <u>Nebria desolata</u> Kavanaugh	956
Fig. 343. Bursa copulatrix, <u>Nebria obliqua</u> LeConte	956
Fig. 344. Bursa copulatrix, <u>Nebria nivalis nivalis</u> (Paykull)	956
Fig. 345. Spermatheca and duct, <u>Nebria virescens</u> Horn	956
Fig. 346. Spermatheca and duct, <u>Nebria hudsonica</u> LeConte	956
Fig. 347. Spermatheca and duct, <u>Nebria frigida</u> Sahlberg	958
Fig. 348. Spermatheca, <u>Nebria subdilatata</u> Motschulsky	958
Fig. 349. Spermatheca and allied structures, <u>Notiophilus</u> sp	958
Fig. 350. Spermatheca and duct, <u>Nebria piperi</u> Van Dyke	958
Fig. 351. Spermatheca and duct, <u>Nebria pallipes</u> Say	958
Fig. 352. Spermatheca and duct, <u>Nebria crassicornis intermedia</u> Van Dyke	960
Fig. 353. Oviduct and bursa copulatrix, <u>Nebria brevicollis</u> (Fabricius)	960
Fig. 354. Oviduct and bursa copulatrix, <u>Nebria virescens</u> Horn	960
Fig. 355. Altitude and latitude components of distribution: <u>Nebria hudsonica</u> LeConte	962
Fig. 356. Altitude and latitude components of distribution: <u>Nebria gyllenhali</u> (Schonherr)	962
Fig. 357. Altitude and latitude components of distribution: <u>Nebria obliqua</u> LeConte	964
Fig. 358. Altitude and latitude components of distribution: <u>Nebria purpurata</u> LeConte	964
Fig. 359. Relationship between proximity to water and altitude	

	among <u>Nebria</u> , Front Range, Colorado	966
Fig. 360.	Cell of <u>Nebria diversa</u> LeConte larva	968
Fig. 361.	Life cycle timing: schematic representation	968
Fig. 362.	Thoracic venter, <u>Nebria eschscholtzii</u> Menetries, bearing mites	970
Fig. 363.	<u>Histicsoma maritimus</u> (Oudemans) (Acarina: Anoetidae) immature	970
Fig. 364.	Floating posture, <u>Nebria piperi</u> Van Dyke	972
Fig. 365.	Comparison in species group composition between Lindroth's (1961a) classification a two proposed earlier	974
Fig. 366.	Comparison in species group composition between Lindroth's (1961a) classification of Nearctic taxa and three proposed later	976
Fig. 367.	Sample cladogram reflecting relationships among extant taxa	978
Fig. 368.	Hypothetical reconstruction of transformation series .	978
Fig. 369.	Cladogram illustrating hypothetical set of relationships among <u>Nebria</u> and allied genera	978
Fig. 370.	An example of use of "character correlation" in cladistic analysis	978
Fig. 371.	A hypothetical evolutionary sequence	978
Fig. 372.	Distribution of character states among Nearctic <u>Nebria</u> species and their Palaearctic relatives	980
Fig. 373.	Cladogram illustrating proposed phylogenetic relationships among Nearctic <u>Nebria</u> species and their Palaearctic relatives	991

Fig. 374.	Frequency distribution of characters and total number of extra evolutionary steps	993
Fig. 375.	Frequency distribution of characters and intrinsic extra steps	993
Fig. 376.	Frequency distribution of characters and convergent, intrinsic steps	993
Fig. 377.	Frequency distribution of characters and reversed, intrinsic steps	993
Fig. 378.	Frequency distribution of character states and convergent, extrinsic steps	993
Fig. 379.	Frequency distribution of character states and reversed, extrinsic steps	993
Fig. 380.	Geographical distribution map for <u>Nebria brevicollis</u> (Fabricius) records in North America	995
Fig. 381.	Geographical distribution map for <u>Nebria virescens</u> Horn	995
Fig. 382.	Geographical distribution map for <u>Nebria paradisi</u> Darlington	995
Fig. 383.	Geographical distribution map for <u>Nebria gouleti</u> new species	995
Fig. 384.	Geographical distribution map for <u>Nebria hudsonica</u> LeConte and <u>Nebria lacustris</u> Casey	995
Fig. 385.	Geographical distribution map for <u>Nebria nivalis</u> (Paykull)	997
Fig. 386.	Geographical distribution map for <u>Nebria nivalis</u> (Paykull)	997
Fig. 387.	Geographical distribution map for <u>Nebria crassicornis</u>	

Van Dyke	997
Fig. 388. Geographical distribution map for <u>Nebria gyllenhali</u> (Schonherr)	999
Fig. 389. Geographical distribution map for <u>Nebria frigida</u> Sahlberg	999
Fig. 390. Geographical distribution map for <u>Nebria acuta</u> Lindroth and <u>Nebria lyelli</u> Van Dyke	1001
Fig. 391. Geographical distribution map for <u>Nebria sahlbergii</u> Fischer von Waldheim	1001
Fig. 392. Geographical distribution map for <u>Nebria arkansana</u> Casey	1001
Fig. 393. Geographical distribution map for <u>Nebria gregaria</u> Fischer von Waldheim and <u>Nebria charlottae</u> Lindroth	1001
Fig. 394. Geographical distribution map for <u>Nebria fragilis</u> Casey and <u>Nebria zioni</u> Van Dyke	1001
Fig. 395. Geographical distribution map for <u>Nebria obliqua</u> LeConte	1003
Fig. 396. Geographical distribution map for <u>Nebria pallipes</u> Say	1003
Fig. 397. Geographical distribution map for <u>Nebria appalachia</u> Darlington	1003
Fig. 398. Geographical distribution map for <u>Nebria suturalis</u> LeConte	1003
Fig. 399. Geographical distribution map for <u>Nebria mannerheimii</u> Fischer von Waldheim and <u>Nebria darlingtoni</u> new species	1005

Fig. 400. Geographical distribution map for Nebria eschscholtzii
Menetries, Nebria desolata Kavanaugh, and Nebria
navajo 1005

Fig. 401. Geographical distribution map for Nebria diversa
LeConte 1005

Fig. 402. Geographical distribution map for Nebria gebleri
Dejean 1005

Fig. 403. Geographical distribution map for Nebria spatulata
Van Dyke 1005

Fig. 404. Geographical distribution map for Nebria ovipennis
LeConte 1005

Fig. 405. Geographical distribution map for Nebria kincaidi
Schwarz and Nebria carri new species 1005

Fig. 406. Geographical distribution map for Nebria meanyi
Van Dyke 1007

Fig. 407. Geographical distribution map for Nebria metallica
Fischer von Waldheim 1007

Fig. 408. Geographical distribution map for Nebria vandykei
Banninger and Nebria ingens Horn 1007

Fig. 409. Geographical distribution map for Nebria piperi
Van Dyke, Nebria schwarzi Van Dyke, and Nebria
purpurata LeConte 1007

Fig. 410. Geographical distribution map for Nebria coloradensis
Van Dyke and Nebria piute Erwin and Ball 1007

Fig. 411. Geographical distribution map for Nebria trifaria
LeConte 1007

Fig. 412. Geographical distribution map for the virescens species

group	1009
Fig. 413. Geographical distribution map for the <u>paradisi</u> species	
group	1009
Fig. 414. Geographical distribution map for the <u>gregaria</u> species	
group	1009
Fig. 415. Geographical distribution map for the <u>hudsonica</u>	
species group	1009
Fig. 416. Geographical distribution map for the <u>gyllenhali</u>	
species group	1009
Fig. 417. Geographical distribution map for the <u>mannerheimii</u>	
species group	1011
Fig. 418. Geographical distribution map for the <u>trifaria</u>	
species group	1011
Fig. 419. Geographical distribution map for the <u>ovipennis</u>	
species group	1011
Fig. 420. Geographical distribution map for the <u>obliqua</u> species	
group	1011
Fig. 421. Geographical distribution map for the <u>metallica</u>	
species group	1011
Fig. 422. Numbers of <u>Nebria</u> species and subspecies represented	
in 5° latitude and longitude intervals	1013
Fig. 423. Histogram for <u>Nebria</u> diversity in relation to	
latitude	1013
Fig. 424. Histogram for <u>Nebria</u> diversity in relation to	
longitude	1013
Fig. 425. Centers of endemism among Nearctic species and	
subspecies of <u>Nebria</u>	1015

Fig. 426.	Diagrammatic representation of <u>Nebria</u> faunal similarities, based on Simpson coefficients, for mountain ranges of central and southern Rocky Mountain regions and for ranges of central and southern Pacific Coast regions	1015
Fig. 427.	Diagrammatic representation of <u>Nebria</u> faunal similarities, based on Jaccard coefficients, for mountain ranges of central and southern Rocky Mountain regions and for ranges of central and southern Pacific Coast regions	1015
Fig. 428.	Mountain systems and ranges of North America	1017
Fig. 429.	Principal drainage systems of North America	1017
Fig. 430.	Diagrammatic representation of <u>Nebria</u> faunal similarities, based on Simpson coefficients, among major montane regions	1019
Fig. 431.	Diagrammatic representation of <u>Nebria</u> faunal similarities, based on Jaccard coefficients, among major montane regions	1019
Fig. 432.	Eastern geographical range patterns	1021
Fig. 433.	Rocky Mountain geographical range patterns	1023
Fig. 434.	Pacific coastal geographical range patterns	1025
Fig. 435.	Northern and transamerican geographical range patterns	1027
Fig. 436.	Scattergram relating lower limit of microhabitat range to southern limit of geographical range . . .	1029
Fig. 437.	Vicariance patterns among Nearctic <u>Nebria</u> subspecies .	1031
Fig. 438.	Vicariance patterns among Nearctic <u>Nebria</u> sister	

	species or other closely related species	1031
Fig. 439.	Vicariance patterns within Nearctic <u>Nebria</u> species groups	1031
Fig. 440.	Relationship between geographical range patterns and vicariance in <u>Nebria</u> subspecies	1033
Fig. 441.	Relationship between geographical range patterns and vicariance in <u>Nebria</u> species	1035
Fig. 442.	Patterns of altitudinal zonation among <u>Nebria</u> taxa: Cascade Range (Mount Rainier) and Sierra Nevada (Yosemite)	1037
Fig. 443	Patterns of altitudinal zonation among <u>Nebria</u> taxa: Rocky Mountains (Front Range, Colorado; and Sangre de Cristo Range, New Mexico)	1039
Fig. 444	The author conferring with his major professor on a point critical to the project	1041

4.2 ZOOGEOGRAPHY

4.21 Introduction

The objective of zoogeography is to describe distributional relationships of and patterns among extant organisms and to reconstruct historical antecedents of these relationships and patterns. Interpretation of present distributions in terms of climatic and geologic (physiographic) history promotes an understanding of the evolutionary history of a group in a context of space and time.

In this section, I first describe distribution patterns among Nearctic Nebria and their Palaearctic relatives and then attempt to reconstruct the distributional history of the group using various clues available. Darlington (1957), Erwin (1970), and Whitehead (1972) discussed the kinds of clues most frequently followed. In my study of Nebria, I relied mainly on "numbers" and "vicariance" clues; and their use is described in discussions of individual analyses.

I consider it important to bear in mind that descriptions and analyses of distribution cannot be divorced from taxonomic interpretation because, necessarily, distributions must apply to groups of organisms, and these groups must be taxonomic units at some level of inclusiveness. Decisions on formal and relative ranking of taxa may then have profound effects on results of zoogeographic analyses and on relationships and patterns perceived. These points were considered when taxonomic levels of comparison were chosen for analyses presented below. Taxa, distributions of which are described and analysed here, are those presented in the classification (section

3.33). The degree to which concordance is demonstrated between present distributions of these taxa and probable consequences of past physiographic and/or climatic events is both a measure and a test of the predictive value and correctness of the phylogeny upon which the classification is based. This concordance (or lack of same) is discussed below in section 4.3.

4.22 Contemporary zoogeography: present patterns of distribution

4.221 Generic, lineage, and species group patterns

General pattern for the genus

Genus Nebria occupies almost the entire Holarctic Region, as well as the south slope of the Himalaya and montane areas on Taiwan. Members are present in Eurasia as far north as the Arctic coast (east and west) and as far south as the Atlas Mountains of Morocco and Algeria and parts of Syria in the west and Taiwan in the east. In North America, members are restricted to areas north of 30° N latitude (see Fig. 422).

Nebria faunas are most diverse in areas rich in montane, riparian habitats, although members of a few species occupy areas with lowland forest or parkland habitats and/or are not associated with water bodies (see section 3.231 above). The ranges of very few species extend into areas with warm climates; and no species are known to occupy tropical or subtropical areas. I am at present unable to accurately define centers of species and subspecies diversity on a world-wide basis, mainly because I cannot yet assess the taxonomic

status of each of the numerous Palaearctic nominal species. Highest diversity in nominal species and subspecies occurs in western Europe, especially in the Alps and Carpathian and Caucasus Mountains.

Other nebriine genera and those of closely related tribes (e.g. Notiophilus, Paropisthius, and Opisthius) occupy ranges which are wholly or in large part sympatric with the range of Nebria. There are, therefore, no readily apparent vicariance patterns among these genera with respect to Nebria. It is possible, however, that a better understanding of phylogenetic relationships within each of these genera and within Nebria on a world-wide basis will permit recognition of some early vicariance relationships as distinct from the massive dispersals which have undoubtedly occurred since the ancestors of these genera first diverged.

Patterns among lineages and species groups

Geographical distributions of species groups which include Nearctic species are illustrated in Figs. 412 - 421. Ranges for lineages of which respective groups are members can be reconstructed by combining the ranges of all included groups. All four lineages (see cladogram, Fig. 373) represented in the Nearctic fauna are shared with the Palaearctic Region; and the respective range of each is broadly sympatric with that of all others. Although four lineages are recognized in the classification presented, only two monophyletic groups are actually represented--(1) the virescens lineage, and (2) the group comprising the remaining lineages (i.e. the gyllenhali, gregaria, and metallica lineages). Together, these two monophyletic groups include a total of 62 species, only 20 of which are restricted to the Palaearctic region and three of which (all in the gyllenhali

group) are shared between both regions. The virescens lineage is more diverse in the Palaearctic Region (two species compared to one) while the group including the other lineages is more diverse in the Nearctic Region (39 species compared to 20).

Of the 10 Nearctic species groups considered, only three are endemic to North America--the hudsonica, mannerheimii, and trifaria groups; and the sister groups of each of these taxa include Palaearctic species. Of the groups shared between the Nearctic and Palaearctic Regions, three--the virescens, paradisi, and gyllenhali groups--are more diverse in the latter region; one--the metallica group--is equally diverse in both regions; and three--the gregaria, obliqua, and ovipennis groups--are more diverse in the Nearctic Region. Among lineages with Nearctic representatives, there are no species groups which are restricted to the Palaearctic Region.

Reference to maps illustrating geographical distributions of species groups (Figs. 412 - 421) reveals the following pattern: Palaearctic representation of groups including Nearctic species is restricted, except for the gyllenhali group, to northeastern Asia, north of the Himalaya and west only to the Altai Mountains of western Mongolia and southcentral Siberia. The ranges of two species, N. nivalis and N. gyllenhali, are almost circumpolar and alone account for the broader range of the gyllenhali group. Therefore, except for the component represented by these two species, groups represented in North America are absent from Europe and western and southern Asia. My limited studies to date on the Palaearctic fauna suggest that the Himalayan Nebria fauna shares many elements with the European fauna but none with the Nearctic fauna. Japan stands out as an area in

which the ranges of Nearctic species groups and European/Himalayan elements overlap [these two faunas are otherwise geographically separate].

In summary then, Nebria lineages and species groups represented in the Nearctic Region comprise a part of the holarctic fauna which is generally restricted to North America and northeastern Asia. Both species and species group diversity in this trans-Beringian fauna is greater in North America than in Asia, although Nebria diversity in general is greater in the Palaearctic than the Nearctic Region. There is no evidence of phylogenetic or faunistic relationship between North American and European groups or lineages.

4.222 Present distributions of Nearctic species and their relatives

Geographical distribution patterns

Members of genus Nebria are widely distributed in North America, north of 30°N and south of 75°N, ranging east/west from Newfoundland to the outermost Aleutian Islands. Analyses of distribution which follow are based on data from Tables 1-13, Appendix B., and distribution maps for included taxa. They represent an attempt to quantify the data for discussion and illustration purposes. Some of the methods used are those introduced or used by Ball and Freitag (in Freitag, 1969), Erwin (1970), Nimmo (1971), and Whitehead (1972). Where appropriate, comparisons are made between my findings and those presented in the above papers. Only Nimmo's study of the Rhyacophilidae and Limnephilidae of Alberta and eastern British Columbia treats a group with predominantly montane distribution and

could therefore be expected to have produced comparable findings.

Patterns of diversity.---The geographical distributions of all Nearctic species and subspecies are illustrated by dot maps (Figs. 380 - 411). In order to describe the overall diversity pattern, I used the technique of Erwin (1970) and Whitehead (1972) and overlaid these maps with a grid map (Fig. 422). I calculated total number of taxa represented in each grid unit (each marking off an area equal to 5° longitude by 5° latitude), number of taxa represented in each latitudinal and longitudinal 5° interval, "total interval values" (TIV) (Ball and Freitag, in Freitag, 1969), and "average landmass interval values" (ALIV) (Erwin, 1970). Number of "landmass units" (LU) per interval was adjusted where necessary (e.g. at sea coasts and lake shores) for the actual amount of land in the grid unit (to nearest 0.1 unit). These data are presented in Table 16; and numbers of taxa represented in each interval are also illustrated by histograms (Figs. 423 and 424).

As the grid map illustrates, greatest Nebria diversity is centered in the West, specifically along the West Coast, from southeastern Alaska to California, with a maximum in western Washington. A second major center of diversity includes the central and southern Rocky Mountain region and the Colorado Plateau. From these centers, diversity decreases in all directions--most gradually to the north, most abruptly southward (e.g. a total of 36 taxa are represented in interval "h" ($40-35^{\circ}$ N) and only three taxa are represented in interval "i" ($35-30^{\circ}$ N). A classical subtraction pattern (Darlington, 1957) is apparent in the Alaskan fauna--diversity decreases steadily in a transect from the base of the

Table 16. Total number of species and subspecies, "approximate landmass units" (LU), "average landmass 5° interval values" (ALIV), and "total interval values" (TIV) derived from Fig. 422.

Interval	no. taxa	LU	ALIV	TIV
<hr/>				
longitude				
A	1	0.1	10.0	1
B	2	0.1	20.0	2
C	2	0.1	20.0	2
D	3	0.1	30.0	3
E	5	0.5	18.0	9
F	5	1.9	5.3	10
G	5	2.8	3.9	11
H	4	2.6	4.2	11
I	7	2.0	5.0	10
J	8	2.1	5.2	11
K	12	2.1	9.5	20
L	17	2.8	10.4	29
M	15	3.9	7.7	30
N	32	6.7	9.7	65
O	25	8.1	7.0	57
P	23	9.1	4.8	44
Q	15	9.4	3.4	32
R	5	9.1	0.9	8
S	3	8.9	0.4	4
T	3	7.6	0.8	6

Table 16. (continued)

Interval	no. taxa	LU	ALIV	TIV
U	6	7.4	1.4	10
V	6	6.7	1.6	11
W	5	5.8	1.9	11
X	5	5.7	1.8	10
Y	5	4.2	2.6	11
Z	4	2.4	2.1	5
A'	3	1.2	4.2	5
B'	0	0.3	0.0	0
latitude				
a	2	9.9	1.0	10
b	3	17.2	1.9	33
c	12	13.5	4.1	56
d	17	13.7	5.2	71
e	20	14.7	4.8	71
f	30	12.8	5.7	73
g	35	10.8	5.8	63
h	36	9.4	5.2	49
i	3	7.8	0.4	3
j	0	3.7	0.0	0

Alaskan Peninsula to the outer Aleutian Islands. This pattern can be extended further, however, if the Pacific coastal arc from Washington to Alaska is included. The relatively high diversity recorded for grid unit "L/d" reflects the merger of coastal and Rocky Mountain faunas in this area (see also below). A lowpoint in east/west diversity is reached in the Great Plains (intervals "R", "S", and "T"). Although diversity increases slightly in the Appalachian region, only nine taxa (13% of the Nearctic fauna) are represented east of 100° W longitude, and only five of these are restricted to that area.

This pattern of Nebria diversity corresponds quite clearly (and as expected) to the distribution of mountain ranges--the latter are themselves more abundant and complexly distributed in the West than in the East. However, the uniquely high diversity of taxa in western Washington and the sharp truncation of diversity below 35° N cannot be explained on the basis of mountain distributions alone. There are, in fact, numerous mountain ranges south of this area, including the expansive highlands of Mexico. Other explanations (e.g. historical, climatic, etc.) must be sought to account for the pattern.

Low diversity in lowland areas (whether north, south, or central) reflects the small number of Nebria taxa whose members are adapted to occupy these habitats. In contrast with patterns seen among groups with predominantly lowland distributions (e.g. Evarthrus [Ball and Freitag, in Freitag, 1969]; Brachinus [Erwin, 1970]; and Schizogenius [Whitehead, 1972]), it is lowlands rather than mountains which serve as barriers for or limits to Nebria distribution. Those few lowland forms which have evolved are, in every instance, distributed on both

sides of mountain systems (e.g. see distributions of N. eschscholtzii [Fig. 400] in relation to the Sierra Nevada, N. obliqua [Fig. 395] in relation to the Rocky Mountains, and N. pallipes [Fig. 396] and N. lacustris [Fig. 384] in relation to the Appalachian Mountains. These findings suggest that climates of lowland areas are important factors limiting distributions of both montane and lowland Nebria taxa and that mountains do not serve as barriers for distributions of either (see also below).

Centers of endemism.--Centers of diversity may represent areas of overlap in ranges of two or more broadly distributed taxa, or of concentrations of taxa with restricted but congruent ranges. The latter may arise in areas where ancient forms have survived as relicts and exist alongside more recent arrivals, or where a diversity of local environmental factors promote local differentiation and restricted distribution, or where both of the above occur.

I examined the centers of diversity discovered from the grid plot by applying Whitehead's (1972) technique for finding "centers of concentration". I plotted centers of geographical distributions of all species and subspecies for which maximum linear extent of range is less than or equal to 1600 km (based on data from Table 6), and circled each center to enclose all localities within a 250 km radius of it. Results are illustrated in Fig. 425. In effect, by excluding wide-ranging taxa from consideration and focusing on centers of concentration of restricted taxa, I forced recognition of the latter, and thereby determined that, in fact, more than range overlap of wide-ranging taxa is involved. The apparent pattern is consistent with that recognized from the grid plot (Fig. 422) but represents a

refinement of its description. As noted by Whitehead (1972), his "centers of concentration" correspond to centers of endemism and are distinct from centers of diversity per se. This graphic technique demonstrates that, within some centers of diversity outlined above, there are two or more distinct centers of endemism, some of these with very limited extent. The general distributional pattern is also seen to be much more complex than is evident from the grid plot.

The west (Pacific) coastal center of diversity can now be recognized as a complex, north/south series of centers of endemism. The most diverse of these include (1) Cascade Range north of the Columbia River (five endemic taxa) and (2) Sierra Nevada (seven endemic taxa). Each of these centers can be more finely split into subcenters, each with endemic subspecies represented. [A description of these is better considered with discussion of vicariance relationships (see below)]. Less diverse centers of endemism in the Pacific coastal area include the Siskiyou and Klamath Mountains (California and Oregon) together (two endemic taxa), Vancouver Island and the Olympic Peninsula together (two endemic taxa), and the Aleutian Islands, Queen Charlotte Islands, Coast Mountains of British Columbia, and Warner Mountains (California) (one endemic taxon each).

Distribution of centers of endemism within the central and southern Rocky Mountain/Colorado Plateau center of diversity is even more complex than that in the west coast center (Fig. 425). Separate centers of endemism can be recognized for (1) the Teton, Wind River, and Gros Ventre Ranges together (two endemic taxa), (2) the Wasatch Mountains (one endemic taxon), (3) the Uinta Mountains (one endemic taxon), (4) the Rocky Mountains of Colorado, southcentral Wyoming,

and northcentral New Mexico together (four endemic taxa), and (5) the southwestern Colorado Plateau (six endemic taxa in distinct subcenters) (see below).

Other centers of endemism include the following: (1) main range of the Rocky Mountains of Alberta and British Columbia (from Peace River to just south of Banff) (one endemic taxon); (2) Salmon River Mountains (central Idaho) (one endemic taxon); and (3) the southern Appalachian Mountains (specifically, parts of the Blue Ridge south of the French Broad River) (two endemic taxa). The northeastern "center" evident in Fig. 425) represents the center of the range of N. nivalis gaspesiana n. ssp., a taxon endemic to the area, but which occupies disjunct parts of same.

Just as with centers of diversity, centers of endemism in Nebria do not correspond to such centers for lowland carabid groups studied to date (e.g. Evarthrus [Ball and Freitag, in Freitag, 1969], Brachinus [Erwin, 1970], and Schizogenius [Whitehead, 1972]). In fact, both diversity and endemism patterns in Nebria are more or less complementary to those of these other groups. Some congruency in patterns of endemism should be found, however, when other montane groups are studied in detail.

Extent of geographical range.--In the above plot (Fig. 425), some distortion of the distributional pattern was introduced by limiting representation of taxon distribution to a maximum radius of 250 km about the range center. Several of the taxa considered have ranges much larger than this, and position and apparent size of centers of their ranges as plotted are somewhat misleading (e.g. as noted above for N. nivalis gaspesiana). An analysis of range size characteristics

of the fauna is therefore important for proper interpretation of the significance of apparent centers of endemism. Based on data from Table 6 on maximum linear extent of range (m.e.r.) in kilometers for Nearctic taxa, I calculated the frequency distribution of ranges in size classes (each representing a 400 km size range). Results are recorded separately for species and subspecies in Table 17. Size classes are the metric equivalents of those of Ball and Freitag (in Freitag, 1969), Erwin (1970) and Whitehead (1972). Direct comparisons are therefore possible between findings of these workers and those for Nebria. Fifty-five percent of all Nebria species and 79% of all subspecies have m.e.r. values less than 1600 km (=1000 mi.). Average m.e.r. values for species and subspecies are 2511 km and 1241 km, respectively. The average value for maximum range extent in Nebria species is larger than for Evarthrus species (1120 km [=700 mi.]), Brachinus species (2080 km [=1300 mi.]), and Schizogenius species (1600 km [=1000 mi.]) (values from Whitehead, 1972). The high average m.e.r. value recorded for Nebria species is due mainly to presence in the Nearctic fauna of two species with extremely large, circumpolar ranges--namely, N. gyllenhali (m.e.r.=22,550 km) and N. nivalis (m.e.r.=17,100 km). Range of the latter is comparable to that of Schizogenius pygmaeus Van Dyke (m.e.r. 16,000 km). Among endemic Nearctic taxa, the largest m.e.r. value is that for N. gyllenhali castanipes (m.e.r.=6900 km).

Percentage of Nebria species with restricted ranges (i.e. m.e.r. values less than or equal to 1600 km) (55%) is higher than that in Brachinus (42%), slightly less than that in Schizogenius (60%), and considerably less than that in Evarthrus (79%) (values from Whitehead,

Table 17. Frequency distribution of maximum linear extent of geographical range in kilometers for Nearctic Nebria species and subspecies (based on data from Table 6).

Range size class	Species		Subspecies	
	no.	percentage	no.	percentage
over 5200	2	10%	2	4.7%
4801-5200	2		0	
4401-4800	1	14%	0	4.7%
4001-4400	2		0	
3601-4000	0		0	
3201-3600	3	21%	1	11.6%
2801-3200	4		1	
2401-2800	0		1	
2001-2400	3		3	
1601-2000	2		0	
1201-1600	4	55%	2	79.0%
801-1200	1		1	
401-800	5		6	
1-400	13		25	

Average maximum

extent of range:

2511 km

1241 km

1972). However, if percentages of taxa with very restricted ranges (i.e. those with m.e.r values less than 400 km [=250 mi.]) among these same genera are compared, a different picture emerges. Thirty-one percent of Nebria species are in this category, compared with 27% of Evarthrus species, 19% of Brachinus species, and 18% of Schizogenius species. Sixty percent of Nebria subspecies have m.e.r. values less than or equal to 400 km. A relatively high percentage of Nebria taxa, therefore, occupy very restricted ranges, even compared with Evarthrus members, all of which are flightless. Relative discontinuity of habitat (i.e. of montane area) probably accounts for the higher level of range restriction among Nebria than among lowland groups (e.g. Evarthrus) for which suitable habitats may be more continuous. The centers of endemism recognized above are indeed significant, denoting locations of these restricted ranges and, more importantly, overlap in same. Factors affecting range size and the relationship between range size and taxonomically significant differentiation are discussed below (see also Kavanaugh, in press B).

Faunal similarity among drainage systems and montane regions.--Members of most Nebria taxa are associated with snowfields or streams (see section 3.231 for details). It therefore seems reasonable to search for relationships between geographical distributions of taxa and particular drainage systems. Also, as noted above, distributions of Nebria taxa are clearly related to distributions of mountains.

Patterns of endemism and restricted ranges of taxa further suggest relationships between taxa, or groups of same, and certain mountain systems, ranges, or regions. Measures of similarity in Nebria faunas among different drainage systems and/or among different mountain

systems or regions are, therefore, more appropriate for this study than are equivalent measures among centers of diversity or endemism (e.g. Erwin, 1970; Whitehead, 1972) [although these various "centers" may, in fact, correspond to some degree with distributions and/or subdivisions of montane areas]. Using the classifications of drainage systems and of mountain systems and ranges presented in Tables 2 and 1, respectively, and distributional data on Nebria taxa from Tables 2 and 4, I compared faunal similarities between various areas.

1. Drainage systems and Nebria distribution. A review of data presented in Table 4 indicates little if any correlation between distributions of Nebria taxa and particular drainage systems. For example, populations of N. hudsonica and N. obliqua occupy portions of several distinct drainage systems on both sides of the Rocky Mountains-- eastern slope = Mackenzie, Nelson, Missouri, and Arkansas River systems; western slope = Yukon, Fraser, Columbia, Great Basin, and Colorado River systems. This kind of pattern is general rather than unique: different stream systems which drain the same mountain system have similar if not identical Nebria faunas. Faunal similarity among drainage systems appears, therefore, to be due to shared montane source areas rather than, for example, to confluence downstream. Two possible exceptions involve distributions of N. gouleti n. sp. and the species pair, N. desolata and N. navajo n. sp. The range of N. gouleti (Fig. 383) is restricted to the lower Columbia River system, east of the Cascade Range. To date, specimens have been collected only along the lower Columbia River itself, Snake River and its tributaries in western Idaho, and Wenatchee River. Ranges of N. desolata and N. navajo (Fig. 400) demonstrate a vicariance pattern

linking opposite sides of the lower Colorado River system, each apparently restricted to tributaries of the Colorado which drain north and south, respectively (see further discussion below).

These findings support the hypothesis proposed above, based on study of microhabitat distributions and preferences (see section 3.231 above), that associations with streams and other water bodies are essentially means of satisfying temperature requirements and only secondarily, if at all, involve an obligate relationship with water.

2. Mountain regions and systems and Nebria distribution. From even a quick review of data presented in Table 2, associations between distributions of individual taxa and certain mountain ranges, systems, or regions are apparent. These distributions are, of themselves, interesting to examine, especially for the clues they provide about the environmental requirements of taxon members. However, of more general interest and importance are patterns, if any, apparent among distributions of taxa. The significance of a distributional pattern increases with the frequency of its replication; and patterns which are repeated among different taxa, even among taxa representing grossly different groups, or among entire faunas, can be trusted to provide clues to their own origins in relation to past historical (climatic and physiographic) events.

One approach which aids in recognition of patterns among distributions is study of regional faunas and of similarities among these. Patterns of faunal similarity integrate data on distributions of individual taxa with data on range overlap or congruence. My intent was to examine faunal similarities among the least inclusive montane units (84 in number) classified in Table 1. However, the

number of calculations required to compare each unit with all others was prohibitively large, surpassing capabilities of computer facilities available to me as well as time available for hand calculation. I therefore compared Nebria faunal similarities among physiographic regions; and, in this way, the number of montane areas compared was reduced to 20.

Two measures of similarity were used, each providing somewhat different information, and each introducing its own particular bias. The first, Simpson's (1960) coefficient of similarity between two faunas, N_1 and N_2 , is calculated as follows:

$$S = (C/N_1) \times 100$$

where C is the number of taxa shared between the two areas and N_1 is the smaller fauna (lesser number of taxa represented). The second, Jaccard's coefficient of similarity (as defined by Braun-Blanquet, 1932), is calculated as follows:

$$J = (C/N_2) \times 100$$

where C is as above and N_2 is the larger fauna (greater number of taxa represented). If the faunas compared are equal in diversity, then the two similarity measures are equivalent in value and use. Where faunal sizes are very different, each measure emphasizes a particular aspect of similarity. Simpson coefficients, by relating number of taxa shared to the smaller fauna, emphasize similarity. For example, if the smaller fauna includes only one taxon, but it is shared with the larger fauna which includes 10 taxa, the Simpson coefficient equals 100, or identity, even though only 10% of the larger fauna is represented in the smaller. This measure is especially useful in obtaining clues to the relationship between small,

peripheral, depauperate faunas and possible (larger) source areas and faunas. In contrast, Jaccard coefficients emphasize difference, especially the distinctiveness of large faunas, by relating number of shared taxa to diversity in the larger fauna. For example, if the above example is again used, the Jaccard coefficient equals 10, indicative of very low similarity. This measure effectively ignores similarity due to representation of few wide-ranging taxa in both areas compared if respective faunal diversities are very different. High Jaccard coefficients reflect of approximately equal faunal diversities and/or a high percentage of shared taxa.

Results of these tests for similarity in Nebria faunas of montane physiographic areas are presented in Tables 18 (Simpson coefficients) and 19 (Jaccard coefficients) and are graphically illustrated in Figs. 430 and 431, respectively. These tables each consist of two triangular matrices. The upper right matrix lists coefficients of similarity for all pairs of areas, the lower left lists numbers of taxa shared by each pair, and the intervening diagonal row lists numbers of taxa for each area. Each montane area is diagrammatically represented in Figs. 430 and 431. Areas between which coefficients of similarity (Simpson, Fig. 430; Jaccard, Fig. 431) are greater than or equal to 50 are linked by single lines; and those between which similarity values are equal to or greater than 75 are linked by double lines. For purposes of these analyses, species and subspecies were treated independently and equally.

Comparison of illustrations for Simpson and Jaccard coefficients demonstrates that, as expected, similarities measured by the former are more marked and numerous than those measured by the latter.

Table 18. Measure of Nebria faunal similarities among montane regions (as classified in Table 1): data matrix¹, Simpson coefficients (Simpson, 1960).

Mountain region ²																					
1A	1B	1C	1D	1E	2A	2B	3A	3B	3C	3D	3E	3F	4A	4B	4C	4D	6A	6B	6C		
1A	8	63	38	40	0	63	25	50	63	50	38	13	13	100	63	13	13	0	0	0	
1B	5	13	46	40	0	69	15	50	67	67	42	18	20	0	62	30	20	0	0	0	
1C	3	6	13	60	100	77	15	13	22	22	42	18	0	0	31	0	0	0	0	0	
1D	2	2	3	5	100	60	20	20	40	40	60	20	0	0	40	0	0	0	0	0	
1E	0	0	1	1	1	100	100	0	0	0	100	100	0	0	0	0	0	0	0	0	
2A	5	9	10	3	1	18	36	38	44	44	50	36	10	0	43	20	20	20	0	0	
2B	2	2	2	1	1	5	14	13	11	11	25	36	10	0	7	10	10	0	0	0	
3A	4	4	1	1	0	3	1	8	88	88	63	25	25	100	88	50	38	20	0	0	
3B	5	6	2	2	0	4	1	7	9	89	67	33	22	100	89	44	33	20	0	0	
3C	4	6	2	2	0	4	1	7	8	9	78	33	22	50	89	44	33	20	0	0	
3D	3	5	5	3	1	6	3	5	6	7	12	45	20	0	58	30	20	20	0	0	
3E	1	2	2	1	1	4	4	2	3	3	5	11	30	0	36	30	30	20	0	0	

Table 18. (continued)

Mountain region ²																				
	1A	1B	1C	1D	1E	2A	2B	3A	3B	3C	3D	3E	3F	4A	4B	4C	4D	6A	6B	6C
3F	1	2	0	0	0	1	1	2	2	2	2	3	10	0	30	30	50	0	0	0
4A	2	0	0	0	0	0	0	2	2	1	0	0	0	2	50	0	0	0	0	0
4B	5	8	4	2	0	6	1	7	8	8	7	4	3	1	14	60	50	40	0	0
4C	1	3	0	0	0	2	1	4	4	4	3	3	3	0	6	10	50	40	0	0
4D	1	2	0	0	0	2	1	3	3	3	2	3	5	0	5	5	10	40	0	0
6A	0	0	0	0	0	1	0	1	1	1	1	1	0	0	2	2	2	5	50	100
6B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	100
6C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2

¹ Data matrix is actually two triangular matrices. The lower left matrix lists species or subspecies shared by any two regions; the upper right matrix lists Simpson coefficients of similarity for any two regions; and the diagonal row between these, corresponding to co-ordinates of identity for each region, lists the number of taxa in the region.

Table 18. (continued)

2 Units compared here correspond to major physiographic units listed in Table 1. Representation of a taxon in any part of the physiographic unit was recorded, for purposes of this analysis, simply as representation in the whole unit. Data on Nebria distributions from Table 2.

Table 19. Measure of Nebria faunal similarities among montane regions (as classified in Table 1): data matrix¹, Jaccard coefficients (Braun-Blanquet, 1932).

Mountain region ²																				
1A	1B	1C	1D	1E	2A	2B	3A	3B	3C	3D	3E	3F	4A	4B	4C	4D	6A	6B	6C	
1A	8	38	23	25	0	28	14	50	56	44	25	9	10	25	36	10	10	0	0	0
1B	5	13	46	15	0	50	14	31	46	46	38	15	15	0	57	23	15	0	0	0
1C	3	6	13	23	8	56	14	8	15	15	38	15	0	0	29	0	0	0	0	0
1D	2	2	3	5	20	17	7	13	22	22	25	9	0	0	14	0	0	0	0	0
1E	0	0	1	1	1	6	7	0	0	0	8	9	0	0	0	0	0	0	0	0
2A	5	9	10	3	1	18	28	17	22	22	33	22	6	0	33	11	11	6	0	0
2B	2	2	2	1	1	5	14	7	7	7	21	29	7	0	7	7	7	0	0	0
3A	4	4	1	1	0	3	1	8	78	78	42	18	20	25	50	40	30	13	0	0
3B	5	6	2	2	0	4	1	7	9	89	50	27	20	22	57	40	30	11	0	0
3C	4	6	2	2	0	4	1	7	8	9	58	27	20	11	57	40	30	11	0	0
3D	3	5	5	3	1	6	3	5	6	7	12	42	17	0	50	25	17	8	0	0
3E	1	2	2	1	1	4	4	2	3	3	5	11	27	0	29	27	27	9	0	0

Table 19. (continued)

Mountain region ²																				
1A	1B	1C	1D	1E	2A	2B	3A	3B	3C	3D	3E	3F	4A	4B	4C	4D	6A	6B	6C	
3F	1	2	0	0	1	1	2	2	2	2	3	10	0	21	30	50	0	0	0	
4A	2	0	0	0	0	0	2	2	1	0	0	0	2	7	0	0	0	0	0	
4B	5	8	4	2	0	1	7	8	8	7	4	3	1	14	43	36	14	0	0	
4C	1	3	0	0	0	1	4	4	4	3	3	3	0	6	10	50	20	0	0	
4D	1	2	0	0	0	1	3	3	3	2	3	5	0	5	5	10	20	0	0	
6A	0	0	0	0	1	0	1	1	1	1	1	0	0	2	2	2	5	40	40	
6B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	50	
6C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	

¹ Refer to Table 18, footnote ¹, for explanation of matrix organization.

² See comments in Table 18, footnote 2.

However, both tests contribute to recognition of a single pattern of faunal similarities. (1) The Nebria faunas of various parts of the Rocky Mountain region from Idaho and Montana (area 3D) northward are evidently very similar. High similarities (i.e. Simpson coefficients only) between these faunas and that of the so-called "Alaska Rocky Mountains" of northern Yukon and northern Alaska (area 4A) are apparently due to presence in the latter of few taxa, all of which are shared with areas 1A and 3A. This finding reflects the northward subtraction pattern noted above. (2) Similarity between Rocky Mountain and Coastal faunas is high from area 1B northward, but is drastically reduced south of that area. (3) Areas of the south coastal region, and eastward into the Basin and Range physiographic area, are each moderately to highly distinctive (see also Tables 18 and 19), although a widespread species (N. eschscholtzii) is shared among all these areas. (4) Faunas of the central and southern Rocky Mountains and the Colorado Plateau are all relatively similar; and all are distinct from northern Rocky Mountain faunas, except for representation of a few shared, wide-ranging taxa in all these areas. (5) Similarity between western and eastern North American faunas is low, although that between area 6A and all nearest Rocky Mountain areas is moderate (Simpson coefficient=40; see Table 18) due to representation in the former by two widespread taxa (N. gyllenhali castanipes and N. suturalis). [Area 5, the Ozark highlands region, is noted in both figures but not considered in the analyses. Nebria have not yet been recorded from this area (i.e. N=0).]

In summary of these findings, the overall pattern observed is such that, in a transect from the Arctic southward, especially in the

West, faunas of different montane areas at the same latitude are progressively more distinctive (or conversely, that, for given latitudes, similarities increase along a transect northward). In general this pattern coincides with that for centers of endemism (see above, and Fig. 425).

However, similarities noted among faunas of the Colorado Plateau and the central and southern Rocky Mountain areas (3F, 4C, and 4D) seem to contradict the pattern of high endemism within the general area. I therefore re-examined areas 4C and 4D in detail by repeating the above analyses using data for the individual mountain systems or ranges in each area. Similar analyses were also made for mountain ranges of the southern Pacific coastal region (areas 1C through 1E, 2A and 2B, which also appear to be rich in endemic forms). Results are presented in Tables 20 through 23 and Figs. 426 and 427. Because relatively higher similarities were expected among faunas compared in these analyses than among those compared above, mountain areas represented in the figures were only linked by lines if similarity values were equal to or greater than 75.

Closer examination of faunal similarities among mountain ranges within and between areas 4C and 4D reveal details not apparent from analyses of larger physiographic areas. The similarity noted above between these areas is now shown (Fig. 426) to be based on similarity between area 4Da, Laramie Mountains, and several mountain ranges in area 4C. However, as indicated by relatively low Jaccard coefficients, even this similarity is based only on representation of a few shared, widespread taxa. With exception of area 4Da, various mountain ranges of area 4D demonstrate a relatively high level of

Table 21. Measure of Nebria faunal similarities among mountain ranges of the central and southern Rocky Mountain regions: data matrix¹, Jaccard coefficients (Braun-Blanquet, 1932)

Mountain ranges ²																				
4Ca	4Cb	4Cc	4Cd	4Ce	4Cf	4Cg	4Da	4Db	4Dc	4Dd	4De	4Df	4Dg	4Dh	4Di	4Dj	4Dk	4Dl	4Dm	
4Ca	2	29	29	33	20	17	20	67	20	25	14	17	14	20	0	25	25	0	20	25
4Cb	2	7	86	86	71	57	57	43	43	49	57	29	43	29	0	14	14	0	14	14
4Cc	2	6	7	86	71	57	57	43	43	29	43	29	29	29	0	14	14	0	14	14
4Cd	2	6	6	6	83	67	67	50	50	33	43	33	29	33	0	17	17	0	17	17
4Ce	1	5	5	5	5	67	80	40	60	40	43	33	29	40	0	20	20	0	20	20
4Cf	1	4	4	4	4	6	83	33	50	33	43	33	29	33	0	17	17	0	17	17
4Cg	1	4	4	4	4	5	5	40	60	40	43	33	29	40	0	20	20	0	20	20
4Da	2	3	3	3	2	2	2	3	40	50	29	17	14	20	0	25	25	0	20	25
4Db	1	3	3	3	3	3	3	2	5	80	71	67	57	80	20	60	60	0	60	60
4Dc	1	2	2	2	2	2	2	2	4	4	57	50	43	60	25	75	75	0	60	75
4Dd	1	4	3	3	3	3	3	2	5	4	7	71	86	57	14	43	57	0	57	57
4De	1	2	2	2	2	2	2	1	4	3	5	6	86	83	33	50	67	0	67	67

Table 21. (continued)

		Mountain ranges ²																			
		4Ca	4Cb	4Cc	4Cd	4Ce	4Cf	4Cg	4Da	4Db	4Dc	4Dd	4De	4Df	4Dg	4Dh	4Di	4Dj	4Dk	4Dl	4Dm
4Df	1	3	2	2	2	2	2	2	1	4	3	6	6	7	71	29	43	57	0	57	57
4Dg	1	2	2	2	2	2	2	2	1	4	3	4	5	5	5	40	60	60	0	60	60
4Dh	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	25	25	0	20	25
4Di	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3	1	4	75	25	80	75
4Dj	1	1	1	1	1	1	1	1	1	3	3	4	4	4	3	1	3	4	0	80	100
4Dk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	20	0
4Dl	1	1	1	1	1	1	1	1	1	3	3	4	4	4	3	1	4	4	1	5	80
4Dm	1	1	1	1	1	1	1	1	1	3	3	4	4	4	3	1	3	4	0	4	4

¹ Refer to Table 18, footnote ¹, for explanation of matrix organization.

² Alpha-numeric code used for mountain ranges is presented in Table 1. Data on Nebria distributions used in this analysis are from Table 2.

similarity, indicative of a relatively homogeneous fauna for the area. Because Jaccard coefficient for similarity between the Black Hills (4Ca) and Laramie Mountains (4Da) is relatively large ($=67$), and that between the latter and the Medicine Bow Mountains (4Db), a bona fide member of the southern Rocky Mountain (4D) fauna, is equally large, relationships of the faunas of both 4Ca and 4Da may, in fact, be more with area 4D than with 4C as suggested by Simpson coefficients (Fig. 426). This hypothesis is supported by representation of several other carabid taxa in the Black Hills fauna which are shared with the Front Range (area 4Dd) fauna but not with that of other mountain ranges of area 4C. These taxa include Dicaelus sculptilis upioides Ball and Platynus tenuicollis LeConte, both of which are also represented (at least by conspecific populations) in eastern North America. Also, Black Hills and Front Range populations of N. obliqua include both pale- and dark-legged adults. Populations in other mountain ranges of area 4C include only pale-legged adults. Because these different leg color morphs are not recognized taxonomically, and because only Nebria (and not entire carabid) faunas were compared, probable relationships between the Black Hills and the Front and other ranges of area 4D were not immediately apparent from similarity measures alone.

For reasons discussed in sections below, I was particularly interested in comparing faunal similarities between northwestern mountains ranges in area 4D and the Uinta Mountains (area 4Cg) with those between the former and the Wind River Mountains (area 4Cd). Although similarities are generally low between both 4Cd and 4Cg and ranges of area 4D, similarities between faunas of area 4D mountain ranges and the Uinta Mountains are slightly, but consistently, higher

than those between the former and the Wind River Mountains (e.g. Jaccard coefficient [Table 21] for similarity between 4Db and 4Cd = 50, and that between 4Dd and 4Cg = 60). The strongest faunal link, then, between the central and southern Rocky Mountain regions appears to be through the Uinta rather than the Wind River Mountains (if the Black Hills and Laramie Mountains are considered faunistically part of area 4D).

Faunal distinctiveness of various mountain ranges of the southern Pacific coast region noted above is again reflected by the present, more detailed analysis. Faunal connections indicated in Fig. 426 (based on Simpson coefficients) reflect only the broad distribution of N. eschscholtzii throughout the area. High levels of endemism noted above are re-emphasized by reference to generally low values for Jaccard coefficients throughout the area (see Table 23 and Fig. 427). Especially significant are the relatively low similarities between faunas of (1) mountains of Vancouver Island (1Ca) or the Olympic Peninsula (1Cb) and that of the adjacent Cascade Range; (2) portions of the Cascade Range north (2Aa) and south (2Ab) of the Columbia River; (3) portions of the Sierra Nevada north (2Ba) and south (2Bb) of Mammoth Lakes area; and (4) the Siskiyou (1Db) or Klamath (1Dc) Mountains and all other ranges of the Coast Mountain system north and south of these areas.

Unfortunately these analyses, as well as others above, are based solely on Nebria faunas which, although diverse in relation to those of many other genera, represent only fractions of the carabid faunas present in the areas studied. Results presented here therefore give only sample measures of total faunal similarities among these areas.

Table 22. Measure of Nebria faunal similarities among mountain ranges of the central and south Pacific Coast region: data matrix¹, Simpson coefficients (Simpson, 1960)

	Mountain ranges ²											
	1Ca	1Cb	1Da	1Db	1Dc	1Dd	1Ea	1Eb	2Aa	2Ab	2Ba	2Bb
1Ca	8	78	67	0	0	0	0	0	75	50	13	13
1Cb	6	11	100	50	33	100	100	100	82	45	18	25
1Da	2	3	3	50	33	100	100	100	100	100	33	33
1Db	0	1	1	2	100	100	100	100	50	50	50	50
1Dc	0	1	1	2	3	100	100	100	33	33	33	33
1Dd	0	1	1	1	1	1	100	100	100	100	100	100
1Ea	0	1	1	1	1	1	1	100	100	100	100	100
1Eb	0	1	1	1	1	1	1	1	100	100	100	100
2Aa	6	9	3	1	1	1	1	1	16	83	36	25
2Ab	4	5	3	1	1	1	1	1	10	12	36	25
2Ba	1	2	1	1	1	1	1	1	4	4	11	63
2Bb	1	2	1	1	1	1	1	1	2	2	5	8

¹ Refer to Table 18, footnote ¹, for explanation of matrix organization.

² Alpha-numeric code used for mountain ranges is presented in Table 1. Data on Nebria distributions used in this analysis are from Table 2.

Table 23. Measure of Nebria faunal similarities among mountain ranges of the central and south Pacific Coast region: data matrix¹, Jaccard coefficients (Braun-Blanquet, 1932).

Mountain ranges ²												
	1Ca	1Cb	1Da	1Db	1Dc	1Dd	1Ea	1Eb	2Aa	2Ab	2Ba	2Bb
1Ca	8	55	25	0	0	0	0	0	38	33	9	13
1Cb	6	11	27	9	9	9	9	9	56	42	18	18
1Da	2	3	3	33	33	33	33	33	19	25	9	13
1Db	0	1	1	2	67	50	50	50	6	8	9	13
1Dc	0	1	1	2	3	33	33	33	6	8	9	13
1Dd	0	1	1	1	1	1	100	100	6	8	9	13
1Ea	0	1	1	1	1	1	1	100	6	8	9	13
1Eb	0	1	1	1	1	1	1	1	6	8	9	13
2Aa	6	9	3	1	1	1	1	1	16	63	25	13
2Ab	4	5	3	1	1	1	1	1	10	12	33	17
2Ba	1	2	1	1	1	1	1	1	4	4	11	45
2Bb	1	2	1	1	1	1	1	1	2	2	5	8

¹ Refer to Table 18, footnote ¹, for explanation of matrix organization.

² Alpha-numeric code used for mountain ranges is presented in Table

1. Data on Nebria distributions used in this analysis are from Table 2.

I should also note again here the importance of choice of taxonomic units ("operational units") used in analyses. If, for example, species only, rather than species and subspecies, were recorded for each area, similarities among certain areas would appear greater than indicated above. Use of more inclusive taxonomic units permits recognition of more general patterns of similarity at the expense of information on distinctiveness of certain faunas (at subspecies or other relatively low taxonomic levels). I attempted analyses similar to the above using taxonomic units at all levels from subspecies through lineages. In general, when units above the least inclusive (i.e. species and subspecies) were used, faunal similarities among various areas were recorded as very high, and an insufficient range of variation in similarity remained to permit meaningful comparisons among faunas of different areas. I therefore made no use of such analyses.

3. Faunal similarities in relation to macrohabitat. Nimmo (1971) examined patterns of relationship between geographical and altitudinal distributions among caddisfly (Trichoptera) species in Alberta and eastern British Columbia; and I have attempted similar comparisons (see below). This approach seems applicable in studying faunal similarities as well; but for reasons discussed above (see also Kavanaugh, in press A and B), life zone distributions, rather than strictly altitudinal distributions per se, are considered. Wherever similarity is noted between faunas of any two areas, it is of interest to know the life zone distributions of shared taxa. This information can provide additional clues to the nature and timing of historical events responsible for observed patterns of similarity.

Reference to data presented in Table 8 on life zone distributions and to results of analyses on faunal similarities discussed above have led me to the following conclusion. The pattern of similarity among Nebria faunas of various regions of North America corresponds well to the distribution of the Canadian Life Zone (see discussion, section 3.2311). Most areas linked by intervening lowlands, macrohabitats of which can be classified as Canadian Zone or higher (i.e. Hudsonian or Arctic/Alpine Zone), have very similar faunas. In western North America, relative east/west geographical continuity of the Canadian Zone is achieved just north of 52° N latitude. This is reflected by the relatively high similarity between coastal and inland Nebria faunas from that latitude northward, in contrast to low similarities among adjacent (east/west) areas south of that latitude. North/south geographical continuity of the Canadian Zone (at least in montane areas) ends at approximately 45° N latitude. Relatively low similarities between the northern and central Rocky Mountain regions (areas 4B and 4C, respectively, in Table 21 and Fig. 431), between northern and southern portions of the Cascade Range (areas 2Aa and 2Ab, respectively, in Table 23 and Fig. 427) (separated by the Columbia River valley), and between most adjacent (north-south) montane areas further south reflect Canadian Zone discontinuity south of that latitude. One reason for the correspondence noted is that maximum Nebria diversity is represented in the Canadian zone (Kavanaugh, in press B); and, therefore, discontinuity in the range of this zone results in discontinuity in the ranges of a maximum number of taxa. Divergence, subspeciation, and speciation have occurred among disjunct populations of Canadian zone species south of the area

of macrohabitat continuity; and these processes result in faunal divergence (i.e. decreased similarity among disjunct areas).

Most taxa which are represented in the faunas of many different montane areas, especially areas with minimal Nebria diversity, have members adapted for life in the Transition Zone. Taxa of this zone are, in general, responsible for high Simpson coefficients of similarity between faunas which are very different in size. Some of these, such as N. eschscholtzii, are well represented only in this zone, while others, such as N. gyllenhali castanipes and N. obliqua, occupy broad life zone and geographical ranges. One notable exception to this generalization is N. suturalis, which is one of only two taxa shared between eastern and western North American mountains. The life zone range of this species is narrow--restricted to the Arctic/Alpine Zone. Possible explanations for this unique combination of geographical and life zone ranges are discussed in section 4.23.

In general Nebria faunal distinctiveness is, as could be expected, most closely related to high-altitude diversity. Again with the exception of N. suturalis, taxa restricted to high altitudes (i.e. Hudsonian and Alpine Zones) at latitudes south of 50° N have limited geographical ranges as well. Such mountain ranges as the Cascade Range (area 2A), Sierra Nevada (area 2B), and ranges of the southern Rocky Mountains (area 4D), all of which are occupied by several such taxa, owe their distinctiveness to this element of their respective faunas. South of 40° N latitude, however, Canadian and even Transition Zone elements are, in some instances, so restricted by distribution of suitable macrohabitat that they occupy similarly limited ranges and thereby contribute to distinctiveness of their

respective faunas (e.g. as in mountain ranges on the west flank of the Colorado Plateau in Utah, area 3F).

Patterns of concordance among geographical ranges of species and subspecies.--Patterns of faunal similarity are dependent on, and therefore related to, patterns of congruence and overlap among ranges of taxa. Once identified, both kinds of patterns function as generalizations which provide additional and, in some instances, independent clues to the history and development of the fauna. Through study of patterns among ranges as well as individual ranges themselves, it may be possible to look beyond those odd or otherwise confusing distributions (due, for example, to extinctions of certain populations of single taxa) which tend to obscure geographical relationships.

Patterns observed among Nearctic Nebria taxa are described here. Analyses and discussion in this section are based on ranges of taxa as illustrated in Figs. 380 to 411. Where possible, relationships between geographical and macrohabitat range patterns are noted; and the number and names of taxa demonstrating each pattern are also reported. Ranges of all taxa named as fitting a particular pattern do not necessarily extend throughout the full extent of the pattern because the limits of each pattern represent a composite of those of all included taxa. In some instances, the combined ranges of two or more subspecies of a polytypic species were found to correspond to a recognized pattern whereas the individual ranges of each subspecies do not so correspond. I therefore treated the subspecies together rather than separately in such instances. Information on vicariance relationships among these subspecies is therefore lost here, but is

considered in the following section.

A total of 23 different range patterns are recognized here, some of which (as noted) represent extensions of other patterns or combinations of two or more less widespread patterns. It is convenient to classify the patterns geographically into one of four groups; namely, (1) eastern, (2) Rocky Mountain, (3) Pacific coastal, and (4) northern and transamerican patterns. These groups are, at present, somewhat arbitrary, as may become apparent; but certainly a majority of patterns in each group are historically related. Hopefully, future studies on other montane carabid groups will demonstrate similar groups of patterns.

1. Eastern patterns (Fig. 432):

Range pattern 1. This pattern is restricted to southern portions of the Blue Ridge of North Carolina and Tennessee. Two taxa, N. lacustris bellorum n. ssp. and N. appalachia demonstrate this pattern; and both have members restricted to higher elevations in the area (equivalent to Canadian Zone macrohabitat).

Range pattern 2. This pattern extends from the western Great Lakes and northeastern Mississippi River drainage areas eastward across the Appalachian highlands to the Piedmont region, but not onto the Coastal Plain. Its northern limit is yet poorly defined, but probably does not extend more than 200 km north of the St. Lawrence River at any point. Its northeastern limit includes the base of Gaspé Peninsula, New Brunswick, and western Nova Scotia; and its southern limit extends just south of (and therefore includes) range pattern 1. Two taxa, N. lacustris lacustris and N. pallipes, demonstrate this pattern, although range of the former does not extend

south of the French Broad River. Both of these taxa exhibit broad macrohabitat ranges (equivalent to Upper Sonoran through Canadian Zone range). This pattern corresponds most closely with Munroe's (1954) pattern "E3", but does not extend as far southwest as the latter.

Range pattern 3. This pattern unites several disjunct areas including the following: extreme north Appalachian highlands (i.e. Mount Katahdin [Maine], the high mountains of Gaspé Peninsula, western Newfoundland Island, and coastal Labrador, northwest to the east shore of Ungava Bay. Only one Nebria taxon, N. nivalis gaspesiana n. ssp., demonstrates this range pattern; but it is repeated among ranges of a diverse group of other insect species (for examples, see Lindroth, 1957 and 1963a; Howden, 1970). The pattern is similar to, and intermediate between, Munroe's (1954) patterns "NE1" and "NE2". Macrohabitat range of N. gaspesiana includes Hudsonian and Arctic/Alpine Zones.

2. Rocky Mountain patterns (Fig. 433):

Range pattern 4. This pattern includes the northern Rocky Mountain region, from southern Montana and central Idaho northwest to southern Yukon Territory, west to the Pacific Coast at latitudes north of 53° N, but not further south. Also included within limits of the pattern are the Blue Mountains of northeastern Oregon and southeastern Washington and extreme northern ranges of the Basin and Range Province in Nevada (i.e. Jarbridge and Ruby Mountains). Four taxa demonstrate this pattern; namely, N. arkansana edwardsi n. ssp., N. gebleri gebleri and N. gebleri strawberriensis (the latter restricted to a single range in the Blue Mountains), and N. schwarzi schwarzi. The macrohabitat ranges of these taxa are identical, each

being restricted to the Canadian and Hudsonian Zones. This pattern is similar to Nimmo's (1971) pattern "2", but is more restricted both north and south and more extended toward the Columbia Plateau region.

Range pattern 5. This pattern corresponds to pattern 4 in the north, but extends further south, through the central Rocky Mountain region, then southwest through the Wasatch and Uinta Mountains to the northern mountain ranges of the west rim of the Colorado Plateau. Two taxa demonstrate this pattern: N. crassicornis intermedia and N. schwarzi beverlianna. The latter is restricted to the central Rocky Mountain region and is therefore only tentatively assigned to this pattern. Its assignment to pattern 6 or 7 (below) would be equally valid, based on available data. Both taxa are represented in Canadian Zone habitats, but macrohabitat range of the former extends into the Arctic/Alpine Zone. This pattern is different in detail from any described by Munroe (1954) or Nimmo (1971), but is closest to Nimmo's pattern "2".

Range pattern 6. This pattern is similar to pattern 5 except that (1) its southern extension is through the Uinta Mountains, then east to the southern Rocky Mountains of Colorado and southern Wyoming, rather than south in central Utah; (2) it extends more widely on the Columbia Plateau, to the base of the Cascade Range; and (3) its eastern limit extends across southern Canada to northwestern Lake Superior (perhaps represents a disjunct occurrence in the latter area). One taxon demonstrates this pattern; namely, N. hudsonica (Fig. 384). Macrohabitat range of this species includes Canadian and Transition Zones. This pattern is similar to Nimmo's (1971) pattern "9".

Range pattern 7. This pattern extends from the Teton Mountains southward in the central Rocky Mountain region (but not in the Black Hills or the northern Wasatch and Uinta Mountains) to the mountain ranges of western and southern portions of the Colorado Plateau. Actually, the pattern is a composite of ranges of seven taxa which are, in general, allopatric with respect to each other (see distribution maps for each taxon). These taxa include: N. fragilis fragilis, N. fragilis teewinot, N. zioni zioni, N. zioni oasis, N. desolata, N. navajo, and N. piute. Macrohabitat ranges of these taxa are diverse; but that of each is relatively restricted. N. desolata and N. navajo are restricted to the Upper Sonoran zone; N. fragilis fragilis, N. zioni zioni, and N. zioni oasis to the Transition and Canadian Zones; and N. fragilis teewinot and N. piute to the Canadian and lower Hudsonian Zones. Relationship between macrohabitat and geographical range among members of this pattern is such that taxa with more southern ranges are, in general, also restricted to lower life zones (e.g. Upper Sonoran and Transition).

Range pattern 8. This pattern includes the southern Rocky Mountain region of southern Wyoming (except for the Laramie Mountains), Colorado, and northern New Mexico, mountain ranges forming the eastern rim of the Colorado Plateau, and the Uinta and northern Wasatch Mountains. As such, it is similar to the southern end of pattern 6, but is extended further south than the latter. Six taxa demonstrate this pattern; namely: N. gyllenhali lindrothi n. ssp., N. coloradensis, N. purpurata, N. arkansana arkansana, N. arkansana oowah n. ssp., and N. arkansana uinta. The first four taxa listed all have macrohabitat ranges which include the Arctic/Alpine zone, but

each has its own lower limit (e.g. lower range limits for N. coloradensis and N. gyllenhali lindrothi are, respectively, in the Canadian and Transition Zones). N. arkansana oowah is known only from Canadian Zone habitats; and N. arkansana uinta ranges from Canadian to Transition Zone.

Range pattern 9. This pattern (not illustrated in Fig. 433) includes the central and southern Rocky Mountain regions (except for the Black Hills) and the Colorado Plateau, with an extension into the Basin and Range Province (i.e. Jarbridge and Ruby Mountains of Nevada). As such, it combines the ranges of patterns 7 and 8. One taxon, N. trifaria, including its three subspecies, demonstrates this pattern (Fig. 411). I have recognized this as a distinct pattern because geographical ranges of N. trifaria subspecies (and vicariance patterns among same) are grossly incongruent with patterns 7 and 8 (that is, the distinction between the latter two patterns is not reflected in the distributions of N. trifaria subspecies).

Macrohabitat range of N. trifaria is very broad (from Arctic/ Alpine to Transition Zone), although N. trifaria utahensis is geographically restricted to an area devoid of upper Canadian and high life zones.

Range pattern 10. This pattern is the most extensive of Rocky Mountain patterns. It includes the ranges of patterns 4 through 9, except for the eastern extension of pattern 6 (Fig. 433). In addition, it includes much of the Basin and Range Province and extends westward to the eastern slope of the Sierra Nevada and Cascade Range. One species, N. obliqua, demonstrates this pattern; and, as could be expected, its macrohabitat range is broad (Hudsonian to Upper Sonoran Zone) with a low-altitude lower limit. This pattern is similar

to the western portion of Nimmo's (1971) pattern "8" but does not extend as far east in Canada as the latter.

3. Pacific coastal patterns (Fig. 434):

Range pattern 11. This pattern extends throughout the Cascade Range and Coast Mountains (including ranges on the Olympic Peninsula and Vancouver Island) from southern British Columbia to northern California. As such, it circumscribes the core area of highest Nearctic Nebria diversity. Six taxa demonstrate this pattern: N. paradisi, N. vandykei vandykei, N. vandykei wyeast, N. crassicornis crassicornis, N. gebleri cascadiensis, and N. gebleri siskiyouensis. The first four taxa are well represented in the Arctic/Alpine Zone, although only N. paradisi is restricted to that zone. Macrohabitat ranges of N. gebleri subspecies are similar, each centered in the Canadian Zone and slightly extended into the Hudsonian and/or Transition Zone. This pattern is similar to, but less extended north, south, and east than, Nimmo's pattern "4".

Range pattern 12. This pattern is restricted to the Columbia Plateau and adjacent (eastern) mountain ranges (i.e. area 3D, Fig. 428). Two taxa, N. gouletii n. sp. and N. carri n. sp. demonstrate this pattern. The former is restricted to Transition and Upper Sonoran Zone macrohabitats and the latter to the Hudsonian Zone--the highest zone available in the geographical range of the species.

Range pattern 13. This pattern is similar to pattern 11, but extends further north than the latter--to the Yukon/Alaska border; and, south of the Olympic Peninsula, it is confined to the Cascade Range. Two species (four taxa) demonstrate this pattern: N. kincaidi kincaidi, N. kincaidi balli n. ssp., N. meanyi meanyi, and N. meanyi

sylvatica n. ssp. Macrohabitat ranges of all these taxa have their lower limit in the Canadian Zone. The N. kincaidi subspecies also occupy Hudsonian Zone habitats; and N. meanyi meanyi ranges into the Arctic/Alpine Zone in some areas. Neither Munroe (1954) nor Nimmo (1971) described a similar pattern.

Range pattern 14. This pattern (not illustrated in Fig. 434) is strictly coastal, confined to the Pacific seacoast from extreme northern California to the Queen Charlotte Islands, including the west coast of Vancouver Island and certain shore areas inside Puget Sound. Two taxa N. diversa and N. charlottae, may demonstrate this pattern [the placement of N. charlottae is tentative, pending its rediscovery and confirmation of its habitat range]. Members of N. diversa live on open, sandy sea beaches; and in the geographical area of its range, climate of these beaches is roughly equivalent to that of the Canadian Zone. I suggest that members of N. charlottae will also be found to have some association with seacoast habitats.

Range pattern 15. This pattern is restricted to the Aleutian Islands. A single species, N. gregaria, demonstrates this pattern. Members of this species occupy habitats above highest tideline; and in the geographical area of its range, these localities have a climate roughly equivalent to that of the Hudsonian Zone.

Range pattern 16. This pattern includes major portions of patterns 11 and 12. It extends from the Canadian/United States border(or slightly north thereof) south to the San Bernadino Mountains of southern California, and includes the Columbia Plateau, Coast Ranges from Vancouver Island south as well as the Cascade Range and Sierra Nevada. Two taxa demonstrate this pattern: N. virescens and

N. eschscholtzii. The latter is restricted to Transition and Upper Sonoran Zones throughout its geographical range; and the former has a very broad macrohabitat range (from Transition to Arctic/Alpine Zone). This pattern is similar to Munroe's (1954) pattern "W1", but it extends slightly further south and east than the latter and includes the Columbia Plateau (whereas "W1" does not).

Range pattern 17. This pattern is similar to pattern 13 but extends further west along the Alaskan coast (Gulf of Alaska), to the Kenai Peninsula. It also extends further south, to the northern Sierra Nevada. Two taxa, N. acuta and N. gyllenhali lassenensis, demonstrate this pattern. Macrohabitat range of the former is from the Canadian to the Arctic/Alpine Zone, while the latter is restricted to the Hudsonian Zone. This pattern is similar to Munroe's (1954) pattern "W4", but does not extend as far west in Alaska as the latter, and is restricted to the Cascade Range and Sierra Nevada in the south rather than to Coast Mountain ranges.

Range pattern 18. This pattern is similar to pattern 13 with the following exceptions: (1) it extends further west in Alaska to include the Aleutian Islands chain (as far west as Amchitka Island); (2) it includes the Queen Charlotte Islands; (3) its southern limit is broader, including the Warner Mountains of northeastern and the Siskiyou and Klamath Mountains of northwest California; and (4) it extends further east, on the Columbia Plateau and to, and across, the Rocky Mountains in British Columbia and Alberta (as far east as the Swan Hills), and south along these mountains to central Montana. Four species (six taxa) demonstrate this pattern: N. sahlbergii (three subspecies), N. mannerheimii, N. metallica, and N. piperi. All are

well represented in the Canadian Zone. Macrohabitat ranges of N. mannerheimii and all N. sahlbergii spp. extend also into the Transition Zone, and those of N. piperi, N. metallica, and N. sahlbergii sahlbergii include the Hudsonian Zone. This pattern is similar to Munroe's (1954) pattern "NW2", but it extends further south and is more broadly extended in the plateau regions of central British Columbia and central Washington than the latter. Of particular interest (see section 4.23) is the range of N. metallica (Fig. 407) which extends further west in the Aleutian Islands than that of any other species (except the Aleutian endemic, N. gregaria) and further south in the Rocky Mountains than that of any other taxon whose range has been classified here among Pacific coastal patterns.

Range pattern 19. This pattern is restricted to the Sierra Nevada of California and extreme western Nevada. Nine taxa demonstrate this pattern: N. lyelli, N. darlingtoni n. sp., N. spatulata spatulata, N. spatulata sierrae n. ssp., N. ovipennis, N. gebleri rathvoni, N. meanyi lamarckensis n. ssp., N. ingens ingens, and N. ingens riversi. N. darlingtoni is restricted to the Transition Zone and lower limits of the Canadian Zone. The macrohabitat ranges of all other taxa are more or less restricted to higher life zones. Only N. gebleri rathvoni has a range which extends to the Transition Zone; and only meanyi lamarckensis and N. ovipennis share the Canadian Zone with the former. N. lyelli and N. ingens spp. are restricted to the Arctic/Alpine Zone, where N. spatulata spp. are also best represented.

4. Northern and transamerican patterns (Fig. 435):

Range pattern 20. This is a trans-Beringian pattern, which

extends from western Siberia (e.g. Kamchatka, Chukotsk Peninsula) east through Alaska and Yukon Territory to the Anderson River area, and south to extreme northcentral British Columbia. It also extends southwest in Alaska along the Alaskan Peninsula to the inner Aleutian Islands (as far as Unalaska Island). A single species, N. frigida, demonstrates this pattern; and its macrohabitat range is restricted to Arctic/Alpine and Hudsonian Zones. The pattern is similar to Munroe's (1954) pattern "NW3", but its south coastal and eastern limits are more restricted, and its Yukon distribution more extensive, than the latter.

Range pattern 21. This pattern is similar to pattern 20, but it extends further east across arctic Canada to the west shores of Ungava Bay (Labrador) and northeast to Baffin Island. A single taxon, N. nivalis nivalis demonstrates this pattern; and its members occupy habitats only in the Arctic/Alpine and upper Hudsonian Zones. The pattern is intermediate between Munroe's (1954) patterns "A1" and "A2", because it crosses Hudson Bay, but does not reach the Labrador coast. It differs from both these patterns in that it includes interior Alaska, central Yukon Territory, and the Mackenzie River drainage system.

Range pattern 22. This pattern is divided into eastern and Rocky Mountain (disjunct) portions. The eastern part includes the Labrador coast, the east coast of Hudson Bay, summits of the highest mountain peaks in the northern Appalachian ranges of New England (e.g. Mount Washington, New Hampshire), and northern Lake Superior. Degree of continuity between these areas is unknown at present; but areas in New England are certainly isolated from each other and from areas further

north. The western part of the pattern extends from the northern to the southern Rocky Mountain region, although the pattern is certainly discontinuous along this path. A single species, N. suturalis, demonstrates this pattern; and its macrohabitat range is restricted to the Arctic/Alpine zone, except for the population at Black Bay (Lake Superior) which apparently occupies a Hudsonian Zone habitat there.

Range pattern 23. This is a transamerican pattern, which extends from western Newfoundland Island west to the lower Yukon River valley in central Alaska. It extends southeast to the highest peaks of New England and southwest to the central Rocky Mountain region and northern ranges of the Basin and Range Province. Its northern limit corresponds rather well to northern treeline, extending beyond it only in coastal Labrador. A single taxon, N. gyllenhali castanipes, demonstrates this broad pattern. Its members occupy habitats in Transition through Arctic/Alpine Zones; but this subspecies is well-represented only in Canadian and Hudsonian Zones. The pattern is most similar to Munroe's (1954) pattern "C02", but it extends further northeast and northwest than the latter; and it does not extend as far west (at lower latitudes) or southwest as "C02".

From a review of the above patterns and relationships among them, I make the observations discussed here and in following paragraphs. As expected, maximum overlap of range patterns occurs in areas of highest faunal diversity, such as in western Washington (interval "Nf", Fig. 422) and northern Utah (interval "Pg", Fig. 422), unless that diversity is based in large part on endemic taxa. Again, as could be expected, centers of endemism may stand out as areas with high diversity, but also as areas with little overlap in range patterns

(see, for example, the southern Sierra Nevada and southwestern Utah, areas rich in endemic taxa).

Range patterns appear to form more or less regular patterns of concentric rings or perimeters extending out in waves from particular centers. Among these centers are: (a) central, interior Alaska Fig. 435), with patterns 20, 21, and (according to one possible interpretation) part of pattern 23 all extending in waves eastward from this area or from some area further west; (b) western Washington (especially portions of the Cascade Range in that region) (Fig. 434), with patterns 11, 13, 15, and 17 extending northward along the Pacific coast of British Columbia and Alaska, patterns 12, 16, and 18 extending eastward across the Columbia Plateau, and patterns 11, 16, 17, and 19 extending southward; (c) central Utah (Fig. 433), with patterns 5 and 7 extending north and northwest; (d) northern Colorado (Fig. 433), with patterns 6 and 8 extending west then northwest; and (e) southern Blue Ridge of eastern North Carolina and western Tennessee (Fig. 432), with pattern 2 extending north, northeast, and northwest from the area (as defined by pattern 1). Conspicuously absent from this list of centers which demonstrate concentric wave patterns are southernmost centers of endemism: namely, the Sierra Nevada and southwestern Utah. The historical significance of these wave patterns and their apparent absence from certain areas is discussed below in section 4.23.

By comparing individual range patterns with the macrohabitat ranges of their respective included taxa, a relationship between the linear extent and direction of extended waves and macrohabitat (life zone) ranges can be observed (refer to descriptions of patterns

above). The general relationship is as follows: (1) South and east or west extensions (waves) from centers appear to be related to the lower limits of macrohabitat ranges of member taxa and are therefore facilitated among taxa with members adapted for life in lower life zones (e.g. Transition and Upper Sonoran). For example, patterns 2 (Fig. 432), 10 (Fig. 433), and 16 (Fig. 434) reflect distributions of taxa so adapted; and the greater southward extent of pattern 16 than of pattern 11 (Fig. 434) (from the central Washington center) appears to reflect relatively lower minimum limits of life zone ranges for taxa demonstrating pattern 16. (2) Northward extensions from centers appear to be related to upper macrohabitat range limits, at least to some extent. For example, compare patterns 6 and 10 (Fig. 433), which reflect the ranges of N. hudsonica and N. obliqua, respectively. The upper life zone range limit for the former is the Canadian Zone, and that of the latter is the Hudsonian Zone. However, many taxa with high upper life zone range limits also have high lower life zone range limits. Distributions of Hudsonian and Arctic/Alpine macrohabitats throughout low- and mid-latitude areas are markedly discontinuous. As a result, many taxa occupying and restricted to Arctic/Alpine and Hudsonian Zones at lower latitudes do not have geographical ranges extended as far north as expected based on the generalization made above.

One particularly intriguing finding is evidence for a region of cross-over in geographical range patterns in the central Rocky Mountain region (see Fig. 433). This 'Rocky Mountain chiasma' has its point of intersection centered almost exactly over the southwestern corner of Wyoming. The upper-left to lower-right arm of

the "X" is represented by range patterns 6 and 8, which extend from Colorado, New Mexico, and southcentral Wyoming through the Uinta and northern Wasatch Mountains, and then (pattern 6 only) north and northwest into the northern Rocky Mountain region. The other arm of the "X" is represented by range patterns 5 and 7, which extend from southern Utah north through the southern Wasatch Mountains to the northern ranges of the central Rocky Mountain region (e.g. Teton, Wind River, Gros Ventre Mountains) and then (pattern 5 only) north into the northern Rocky Mountain region. For example, if the geographical ranges of N. fragilis (Fig. 394) and N. arkansana (Fig. 392) are superimposed on a single map, the cross-over pattern is readily apparent. This illustration involves taxa with geographical ranges classified in patterns 4, 7, and 8. However, northern arms of the pattern are not always distinct, as ranges of N. hudsonica (pattern 6; and see Fig. 384) and N. crassicornis intermedia (pattern 5; and see Fig. 387) demonstrate if superimposed on a single map. In this example, the pattern is one of simple intersection rather than cross-over. Because (as noted above in appropriate taxon descriptions) the relationships between various populations of N. arkansana and N. fragilis are not yet completely clear, it is possible that the apparent cross-over pattern is merely an artifact of improper assessment of specific identity of members of certain populations (specifically those populations assigned to N. fragilis teewinot n. ssp.). I suggest, however, that the pattern does exist; and I predict that detailed studies on distribution and variation patterns among other groups will also demonstrate it. Possible interpretations of the historical development of the unlikely pattern are discussed in

Table 24. Nebria species and subspecies shared between different Nearctic faunas and between Nearctic and Palaearctic faunas.

Faunas ¹	Taxon shared ²	Pattern no. ³	Life zone range ⁴	Minimum latitude ⁵
<hr/>				
E/NEF + RMF				
	<u>N. suturalis</u>	22	(H) to A/A	n/a
	<u>N. gyllenhali</u>			
	<u>castanipes</u>	23	(T) to (A/A)	52
RMF + PCF				
	<u>N. crassicornis</u>			
	<u>intermedia</u>	5	C to A/A	52
	<u>N. piperi</u>	18	C to H	55
	<u>N. metallica</u>	18	C to H	52
	<u>N. gebleri gebleri</u>	4	(T) to C	52
	<u>N. gyllenhali</u>			
	<u>castanipes</u>	23	(T) to (A/A)	45
	<u>N. sahlbergii</u>			
	<u>sahlbergii</u>	18	(T) to H	50
	<u>N. mannerheimii</u>	18	(T) to C	50
	<u>N. virescens</u>	16	T (A/A)	45 ⁶
	<u>N. hudsonica</u>	6	T to C	45
	<u>N. obliqua</u>	10	US to (H)	36
	<u>N. gouleti</u>	12	US to T	45 ⁶
	<u>N. eschscholtzii</u>	16	US to T	45 ⁶

Table 24. (continued)

Faunas ¹	Taxon shared ²	Pattern no. ³	Life zone range ⁴	Minimum latitude ⁵
<hr/>				
NAF + PAF				
	<u>N. nivalis nivalis</u>	21	H to A/A	60
	<u>N. frigida</u>	20	H to A/A	60

¹ Abbreviations for faunas are as follows: E/NEF = eastern/northeastern fauna; NAF = Nearctic fauna; PAF = Palaearctic fauna; PCF = Pacific Coastal fauna; and RMF = Rocky Mountain fauna (see text for discussion related to each).

² Refer to Figs. 380 - 411 for distribution maps for taxa listed.

³ Pattern numbers refer to patterns illustrated in Figs. 432 - 435 and discussed in text.

⁴ Abbreviations used are as follows: A/A = Arctic/Alpine Zone; H = Hudsonian Zone; C = Canadian Zone; T = Transition Zone; and US = Upper Sonoran Zone (modified from Merriam, 1894a and 1898). Parentheses around an entry denote occurrence of few individuals or populations in a particular zone, or only partial occupation of the zone (i.e. upper or lower extreme only) by taxon members.

⁵ "Minimum latitude" refers to a rough estimate of the southernmost latitude (^oN) at which contact between faunal areas is maintained in the range of the taxon considered. The entry "n/a" (= not applicable) refers to the broad disjunction (and, therefore, lack of contact at any latitude) in the range of N. suturalis.

Table 24. (continued)

⁶ Denotes taxa, ranges of which cross the Columbia Plateau (latitude approximately = 45° N) and are therefore shared by PCF and RMF, but which do not also link these faunas north of that latitude (refer to distribution maps for appropriate taxa).

section 4.23.

Geographical range patterns themselves, and patterns among these patterns, suggest that four different generalized faunas can be recognized in North America; namely, the eastern/northeastern fauna (E/NEF), the Rocky Mountain fauna (RMF), the Pacific Coastal fauna (PCF), and the northwestern (Alaska/Yukon) fauna (NWF). Overlap of geographical range patterns of these respective faunas is very limited, involving relatively few taxa. Data on geographical and macrohabitat ranges of taxa shared between these general faunas are presented in Table 24. Taxa shared by a given pair of faunas are listed in the table in descending order according to the lower limit of their respective life zone ranges (i.e. those taxa with highest lower limits are listed first) and secondarily according to their upper life zone range limits. It is apparent from review of these data that: (1) taxa common to the Palaearctic and Nearctic faunas are restricted to Hudsonian and Arctic/Alpine macrohabitats (life zones); (2) all taxa common to different Nearctic general faunas, with the exception of N. suturalis, have macrohabitat ranges which include the Canadian or lower life zones; and 71% of shared taxa are represented in the Transition Zone; and (3) a direct relationship is apparent between the southernmost limit of the connecting portion of the range of a taxon shared by two general faunas and the lower limit of the life zone range of that taxon (Fig. 436).

These observations agree with those made above in the discussion on similarities among different montane faunas in relation to macrohabitat. Clearly, patterns in both geographical and macrohabitat distributions are apparent among members of the Nearctic Nebria fauna.

Present distributions of taxa may reflect both present distributions of their respective required habitats and effects of various historical events. Geographical and macrohabitat range patterns described above therefore reflect, among included taxa, community in habitat requirements, evolutionary (including distributional) history, or both. Interpretation of these patterns in relation to known details of past geologic and climatic history is attempted in section 4.23.

Patterns of vicariance among Nearctic taxa.--The most generally useful set of clues about distributional histories of taxa and entire faunas are obtained from a study of vicariance patterns. An essential prerequisite to interpretation, or even recognition, of these patterns is an understanding of phylogenetic relationships (particularly sister group relationships) in the group under study, because vicariance patterns based on range disjunctions between other than sister groups are of little, if any, significance (see also Ashlock, 1974; Ball, 1976; and Croizat et al., 1974). Discussion which follows is based on the set of phylogenetic (and sister group) relationships proposed in the cladogram (Fig. 373). Data on the geographical relations of all Nearctic Nebria species and subspecies are summarized in Table 5.

Vicariance relationships are apparent among Nearctic Nebria subspecies, sister species, and sister groups of greater inclusiveness up to and including the species group level. All four lineages represented in North America are broadly sympatric; and, as noted above, ranges of Nebria and all related genera are also sympatric. Below, I discuss vicariance relationships, first among subspecies, and then among species and successively larger groups.

Table 25. Data on vicariance relationships among Nearctic Nebria subspecies.

A. East/West Relationships						
Taxon	Western Vicar	Intervening Gap ¹		Taxon	Eastern Vicar	Range pattern
	Range pattern	Distance(km)	Type			
<u>N. nivalis nivalis</u>	21	93	?	<u>N. nivalis gaspesiana</u>		3
<u>N. crassicornis crassicornis</u>	11	102	L	<u>N. crassicornis intermedia</u>		5
<u>N. gyllenhali gyllenhali</u> ²	--	705	W,L	<u>N. gyllenhali castanipes</u>		23
<u>N. gyllenhali lindrothi</u>	8	46	L	<u>N. gyllenhali castanipes</u>		23
<u>N. acuta quileute</u>	17	111	W,L	<u>N. acuta acuta</u>		17
<u>N. arkansana oowah</u>	8	65	L	<u>N. arkansana arkansana</u>		8
<u>N. arkansana uinta</u>	8	204	L	<u>N. arkansana arkansana</u>		8
<u>N. zioni oasis</u>	7	46	L	<u>N. zioni zioni</u>		7
<u>N. gebleri cascadenis</u>	11	83	L	<u>N. gebleri gebleri</u>		4
<u>N. gebleri strawberriensis</u>	4	65	L	<u>N. gebleri gebleri</u>		4
<u>N. gebleri siskiyouensis</u>	11	204	L	<u>N. gebleri rathvoni</u>		19
<u>N. kincaidi balli</u>	13	160	W,L	<u>N. kincaidi kincaidi</u>		13

Table 25. (continued)

Western Vicar			Intervening Gap			Eastern Vicar		
Taxon	Range pattern	Distance(km)	Type	Taxon	Range pattern			
<u>N. spatulata spatulata</u>	19	37	?	<u>N. spatulata sierrae</u>	19			
<u>N. meanyi sylvatica</u>	13	130	W,L	<u>N. meanyi meanyi</u>	13			
<u>N. trifaria trifaria</u>	9	74	L	<u>N. trifaria utahensis</u>	9			

B. North/South Relationships

Northern Vicar			Intervening Gap			Southern Vicar		
Taxon	Range pattern	Distance(km)	Type	Taxon	Range pattern			
<u>N. lacustris lacustris</u>	2	111	L	<u>N. lacustris bellorum</u>	1			
<u>N. gyllenhali castanipes</u>	23	278	L	<u>N. gyllenhali lassenensis</u>	17			
<u>N. sahlbergii sahlbergii</u>	18	185	L	<u>N. sahlbergii modoc</u>	18			
<u>N. sahlbergii sahlbergii</u>	18	176	L	<u>N. sahlbergii triad</u>	18			
<u>N. arkansana edwardsi</u>	4	222	L	<u>N. arkansana uinta</u>	8			

Table 25. (continued)

Northern Vicar			Intervening Gap		Southern Vicar	
Taxon	Range pattern	Distance(km)	Type	Taxon	Range pattern	
<u>N. fragilis teewinot</u>	7	296	L	<u>N. fragilis fragilis</u>	7	
<u>N. gebleri cascadenis</u>	11	223	L	<u>N. gebleri siskiyouensis</u>	11	
<u>N. meanyi meanyi</u>	13	629	L	<u>N. meanyi lamarcckensis</u>	19	
<u>N. ingens riversi</u>	19	93	L	<u>N. ingens ingens</u>	19	
<u>N. vandykei vandykei</u>	11	93	L	<u>N. vandykei wyeast</u>	11	
<u>N. schwarzi schwarzi</u>	4	962	L	<u>N. schwarzi beverlianna</u>	5	
<u>N. trifaria trifaria</u>	9	93	L	<u>N. trifaria catenata</u>	9	

1 "Intervening gap" refers to the area between the closest populations of respective subspecies.

Straight-line distance was measured directly from distributional dot maps for taxa. Gap "type" refers to the nature of the gap area: L = lowland; W = water (e.g. sea or gulf); and "?" signifies that critical characteristics of the gap are unclear.

2 This taxon is restricted to the Palaearctic Region. I have not described range patterns for that region.

1. Vicariance relations among Nebria subspecies. According to my stated criteria for recognition of subspecies (see section 2.29), geographical ranges of subspecies are, necessarily, allopatric with respect to each other. Therefore, all conspecific subspecies demonstrate vicariance relationships with each other. Data pertinent to study of these relationships are presented in Table 25. For ease of comparison, subspecies pairs are classified as either east/west or north/south vicars. Only relationships between adjacent subspecies are examined. The following generalizations are as based on review and use of these data.

North/south and east/west vicariance patterns are approximately equal in number--12 (46%) and 14 (54%), respectively. There appear to be no fundamental differences in the nature of areas which function as gaps between north/south as opposed to east/west vicariant pairs. With only two exceptions (namely, for N. nivalis and N. spatulata subspecies; see descriptive sections for each), disjunctions between subspecies reflect easily recognizable, extant barriers--namely, lowlands and/or water gaps. The Puget lowland, which separates mainland Washington from the Olympic Peninsula and Vancouver Island, is a combined water/lowland barrier which separates the following subspecies pairs: N. acuta acuta and N. acuta quileute; N. kincaidi kincaidi and N. kincaidi balli; and N. meanyi meanyi and N. meanyi sylvatica. Bering Strait presently appears to function as a barrier separating ranges of N. gyllenhali gyllenhali and N. gyllenhali castanipes. Gaps between all other subspecies pairs correspond to intervening lowlands, or at least to breaks in the continuity of suitable montane habitat. The term lowland as applied here is

relative. For example, the "lowland" gap between N. ingens ingens and N. ingens riversi corresponds to the area around Mammoth Lakes, a lowpoint in the Sierra Nevada south of Yosemite National Park, at an elevation of just over 2750 meters. This is hardly a "low-altitude" area, except in relation to the macrohabitat range of N. ingens, which is restricted to areas above 3400 meters. I have elsewhere (Kavanaugh, in press B) reviewed relationships between macrohabitat ranges of and the nature of gaps between Nebria subspecies.

A statistically significant difference (at $P = 0.99$; T value = 3.554) can be demonstrated between the average gap width (i.e. linear distance between closest populations of different subspecies) separating north/south vicars (280 km [S.D.=172.8]) and that separating east/west vicars (101 km [S.D.=55.1]) (see also Kavanaugh, in press B). One possible interpretation of this finding is that isolation leading to differentiation of north/south vicars is more difficult (or at least requires greater gap distances) than isolation of east/west vicars. This suggestion is consistent with what could be predicted based on orientation of North American mountain chains (most of which run north/south) and on the apparent relative ease with which past movements of biotas have occurred along these chains with changing climate (e.g. during glacial cycles)(see, for example, Ball, 1970; Burger, 1974; Martin, 1958; Larson, 1975; Nimmo, 1971; and Ross, 1965).

Fig. 437 illustrates, diagrammatically, the positions of gaps between adjacent subspecies. Lines connecting nearest heterosubspecific populations are equivalent to so-called "individual

tracks" (Croizat et al., 1974). Where individual tracks for two or more subspecies pairs coincide, a "generalized track" can be recognized. In general, the pattern of individual tracks is diffuse, with relatively little coincidence. This is especially evident for the Rocky Mountain Region, where, in fact, no generalized tracks can be recognized; and subspeciation patterns in this region are more or less random with respect to each other. In the Pacific coastal region, however, four generalized tracks are apparent. The first, based on two individual tracks (namely, for N. crassicornis subspecies and for N. gebleri gebleri and N. gebleri cascadenensis) links faunas on opposite sides of the Okanagan lowland in southcentral British Columbia. The second links opposite sides of the Puget lowland (i.e. The Olympic Peninsula/Vancouver Island with the Cascade Range). It is based on three individual tracks; namely those for N. acuta subspecies, N. kincaidi subspecies, and for N. meanyi meanyi and N. meanyi sylvatica. A third generalized track links portions of the Cascade Range on opposite sides of the Columbia River valley. It is based on two tracks--those for N. gyllenhali castanipes and N. gyllenhali lassenensis and for N. vandykei subspecies. The fourth generalized track, based on individual tracks for N. sahlbergii sahlbergii and N. sahlbergii triad and for N. gebleri cascadenensis and N. gebleri siskiyouensis, links the Cascade Range of central Oregon with the Klamath/Siskiyou mountain system of northwestern California. I note with interest that only one instance of subspecies vicariance (i.e. that for N. meanyi meanyi and N. meanyi lamarckensis) is apparent between the Cascade Range and the Sierra Nevada (see comments below for vicariance among more inclusive groups).

Generalized tracks mark locations of barriers which have more general biotic significance than individual tracks (see Croizat et al. [1974] and Platnick and Nelson [1978] for further discussion). Implications of these tracks for the distributional histories of Nebria faunas are discussed in section 4.23.

In an effort to relate patterns in geographical range to vicariance patterns, pertinent data from Table 25 were reorganized and are presented in Fig. 440. From a review of these data, I note the following: (1) A majority of subspecies vicariance relationships (58% of north/south vicars and 64% of east/west vicars) are confined to single recognized range patterns. I suggest that this reflects the relative recency of range discontinuities among these polytypic species (see below for comparison with vicariance patterns among species). (2) Because range patterns described above are composites of ranges of all included taxa, vicariance relationships of individual taxa conform rather poorly to the limits of different patterns. As a result, there are no instances of replicated vicariance between two range patterns, even in areas where generalized tracks have been recognized (see above). For example, the generalized track across the Okanagan lowland involves subspecies of N. crassicornis and N. gebleri. Although western (coastal) vicars (namely N. crassicornis crassicornis and N. gebleri cascadenis) are both members of range pattern 11, ranges of respective eastern (inland) vicars (i.e. N. crassicornis intermedia and N. gebleri gebleri) are classified in different range patterns--patterns 5 and 4, respectively. In this study at least, examination of relationships between vicariance patterns and geographical range patterns have provided less useful

information than analysis of tracks alone.

2. Vicariance relations among sister species. Data on vicariance relationships among Nearctic Nebria sister species are presented in Table 26. These data and their treatment are similar to that above for subspecies.

Vicariance relationships are demonstrated at present by 11 pairs of sister species, of which five pairs (45%) can be classified as east/west vicars and the remainder (55%) as north/south vicars. Just as with subspecies pairs, there appear to be no fundamental differences in the nature of gaps between north/south and east/west species pairs. N. gregaria and N. charlottae are restricted to island archipelagos and therefore separated by an ocean gap. All other species pairs are separated by lowland terrestrial areas, some of which (such as the Great Plains or the Colorado Plateau) are relatively broad. The nature of the gap between N. lyelli and N. acuta is not yet understood; and these species may, in fact, have parapatric or slightly overlapping ranges. I do not know enough about the southern limit to the range of N. frigida to discuss the gap between it the range of N. daisetsuzana.

The relationship between gap width and vicariance orientation described above for subspecies is not apparent among species. Although the sample size is small and variation within it is great (see Table 26), it appears that gaps between east/west species vicars are relatively larger than those between east/west subspecies vicars in relation to respective north/south vicars. This suggests that speciation among these pairs was related to an older, different set of historical events (such as the Illinoian, rather than Wisconsinan,

Table 26. Data on vicariance relationships among Nearctic Nebria sister species.

A. East/West Relationships

Western Vicar			Intervening Gap ¹		Eastern Vicar	
Taxon	Range pattern	Distance(km)	Type	Taxon	Range pattern	
<u>N. hudsonica</u>	6	1100	L	<u>N. lacustris</u>	2	
<u>N. gregaria</u>	15	2300	W	<u>N. charlottae</u>	14	
<u>N. kincaidi</u>	13	440	L	<u>N. carri</u>	12	
<u>N. piperi</u>	18	340	L	<u>N. schwarzi</u>	4	
<u>N. piute</u>	7	440	L	<u>N. coloradensis</u>	8	

B. North/South Relationships

	Northern Vicar		Intervening Gap		Southern Vicar	
Taxon	Range pattern	Distance(km)	Type	Taxon	Range pattern	
<u>N. frigida</u>	20	? (2000)	?	<u>N. daisetsuzana</u> ²	--	
<u>N. acuta</u>	17	60	?	<u>N. lyelli</u>	19	

Table 26. (continued)

Northern Vicar		Intervening Gap		Southern Vicar	
Taxon	Range pattern	Distance(km)	Type	Taxon	Range pattern
<u>N. fragilis</u>	7	120	L	<u>N. zioni</u>	7
<u>N. mannerheimii</u>	18	620	L	<u>N. darlingtoni</u>	19
<u>N. desolata</u>	7	160	L	<u>N. navajo</u>	7
<u>N. vandykei</u>	11	780	L	<u>N. ingens</u>	19

1 See Table 25 for explanation of gap "type" code used here.

2 This taxon is restricted to the Palaearctic region. I have not described range patterns for that region.

glaciation) which permitted much broader distribution of cold-adapted organisms than was possible during the last glacial period.

Fig. 438 illustrates, diagrammatically, the gaps separating vicariant sister species. Solid lines connecting nearest populations of respective vicars define individual tracks for sister species. In general, the pattern of these individual tracks is less diffuse than the pattern for subspecies tracks, although the simplicity of the pattern may be due in part to the relative paucity of species tracks. Three generalized tracks are apparent among species pairs, only one of which is as clearly defined as those for subspecies. The first is a track linking that portion of the Cascade Range from central Oregon northward with the Sierra Nevada. It is based on two species pairs: N. darlingtoni//N. mannerheimii and N. ingens//N. vandykei. The former pair demonstrate microhabitat ranges including the Canadian and Transition Zones, and the latter pair are restricted to the Arctic/Alpine Zone. This breadth of representation suggests that this is a significant pattern, one which is likely to appear among sister species in many different montane groups. The second generalized track spans the lowland comprising the northern Great Basin, Columbia Plateau, and the Okanagan valley. The two species pairs forming the track are N. carri//N. kincaidi and N. piperi//N. schwarzi. All four species occupy Hudsonian Zone microhabitats; and ranges of all except N. carri extend also into the Canadian Zone. This is the only generalized track which includes both species and subspecies pairs (two of each, for a total of four individual tracks). The third generalized track is less obvious than the others and may, in fact, include unrelated individual tracks--namely, those for N. desolata//

N. navajo and N. coloradensis//N. piute., The track for the former pair links opposite (north/south) sides of the lower Colorado River lowland, and that for the latter pair links opposite (east/west) sides of the Colorado Plateau, specifically across the Green River lowland. Members of the first species pair are restricted to the Upper Sonoran Zone, and those of the second pair range from the Canadian Zone upward.

Relationships between vicariance patterns and geographical range patterns are illustrated in Fig. 441. Although over half of all vicariance patterns among subspecies are confined to single range patterns, only two pairs of sister species are so restricted. Both of these pairs, N. fragilis//N. zioni and N. desolata//N. navajo, have their combined ranges within the range of pattern 7 (Fig. 433). Just as with subspecies, there are no instances of replicated vicariance between the same two range patterns. However, southern vicars representing three different species pairs have their ranges included in pattern 19. Respective northern vicars of these pairs differ in range pattern assignments; but because these different patterns are based mainly on differences in southward extent, the distinction may be trivial here. If so, tracks of these three species pairs (namely, N. acuta//N. lyelli, N. darlingtoni//N. mannerheimii, and N. ingens//N. vandykei) form a coincident, replicated pattern not demonstrated from analysis of tracks alone.

Four pairs of sister species have geographical ranges which are at present broadly sympatric. These include: N. obliqua//N. suturalis, N. appalachia//N. pallipes, N. diversa//N. eschscholtzii, and N. ovipennis//N. spatulata. In each of these pairs, however,

vicariance in habitat distribution is at least suggested. The macrohabitat ranges of N. obliqua and N. suturalis are, in fact, non-overlapping, the latter being restricted to the Arctic/Alpine Zone and the former absent from only this zone. Altitudinal ranges of N. appalachia and N. pallipes and of N. ovipennis and N. spatulata overlap to some degree (see Table 8); but my field observations suggest that abundance patterns for pair members are complementary rather than coincident--that is, at altitudes where one species is most abundant the other is poorly represented. N. diversa and N. eschscholtzii differ in both macro- and microhabitat ranges. Members of the former species live only on open, sandy sea beaches, which are, climatically, equivalent to a Canadian Zone macrohabitat. Members of the latter species live under stones on streambanks in Transition or Upper Sonoran Zone areas. Very few N. eschscholtzii individuals have been collected on ocean beaches occupied by N. diversa members; and most, if not all, of these records are for rivermouth localities, rather than open beaches per se. It is at least tempting to suggest that selection for reduced competition between these macrosympatric sister species may be a force directing (or at least influencing) development of observed patterns of habitat vicariance. The zoogeographic implications of the observed patterns are discussed below (section 4.23).

3. Vicariance relationships among species groups, subgroups, and infragroups. In general, vicariance relationships among Nearctic Nebria become more obscure when successively more inclusive sister groups are compared. An upper limit of obscurity is reached and maintained at and above the lineage level--all Nearctic lineages are

broadly sympatric. This is no doubt correlated with the fact that the inclusiveness of groups generally reflects their age. "Time of origin" of a group (Hennig, 1966) refers to the point in time when its stem species separated from the stem species of its sister group. The more remote that time, the more time there has been for any evidence of vicariance associated with that separation to have been obliterated by subsequent dispersals, extinctions, etc. Nonetheless, certain relationships and patterns are apparent among some Nebria sister groups at present.

The lowest level of inclusiveness above the sister species level is what we might call "sisters once-removed", where one species, A, is judged to be the sister of the common ancestor of two extant species, B and C. Species A, therefore, has no extant sister species, and stands alone as the sister group of species B and C. A total of seven Nearctic and related Palaearctic species are involved in this kind of relationship (see cladogram, Fig. 373). Of these, two are sympatric with one or both of their respective "sisters once-removed". N. gouleti is sympatric with N. hudsonica but not with N. lacustris; and N. gyllenhali is sympatric with both N. frigida and N. daisetsuzana. The remaining species demonstrate vicariance relationships. Three of these, N. virescens, N. metallica, and N. angustula, have respective sisters once-removed on opposite sides of the Pacific Basin. These relationships are illustrated in Fig. 439, respectively, as tracks linking (1) Oregon with northern Honshu (Japan), (2) Amchitka Island (outer Aleutian Islands) with the Komandorskiye Ostrova (Commander Islands), and (3) Kamchatka with Attu Island (Aleutian Islands) (upper track only). Two remaining species, N. arkansana and N. trifaria,

are each parapatric in relation to one of their respective sisters once-removed and allopatric in relation to the other. The geographical ranges of N. arkansana and N. fragilis approximate, but do not overlap, one another in northern Utah (relationship not illustrated); and ranges of N. trifaria and N. coloradensis have the same relationship in central Colorado (relationship not illustrated). In the absence of recognizable barriers to dispersal in the areas in question, the significance of these instances of parapatry is unknown.

The next level of relationship to be considered is that in which a single species is related to a larger groups of species, again as the sister of their common ancestor (stem species) (e.g. see proposed relationships of N. paradisi, Fig. 373). Seven Nearctic and one related Palaearctic species are involved in this kind of relationship. Six of these (namely, N. nivalis, N. crassicornis, N. sahlbergii, N. meanyi, N. gebleri, and N. purpurata) are at present sympatric with one or more members of their sister group. For N. gebleri and N. meanyi, however, I think it is still possible to recognize previous vicariance relationships (see section 4.23 below). N. paradisi and N. mellyi have sister groups on opposite sides of the Pacific Basin. These relationships are represented, respectively, in Fig. 439 by tracks linking (1) Washington with Hokkaido and the Kuril Islands (between Hokkaido and Kamchatka), and (2) southeastern (coastal) Alaska with the Altai Mountains of central Asia. I assume that future collecting in the mountainous regions of eastern Siberia will reduce the latter disjunction somewhat.

The last class of relationships to consider are those between sister groups in which diversity is apparent in both groups.

Among Nearctic sister groups and/or their Palaearctic relatives, six instances of vicariance can be recognized. The obliqua subgroup and the gregaria group (see classification, section 3.33) each have sister groups (including, respectively, N. altaica + N. ochotica + N. japonica and N. snowi + N. carbonaria) which are restricted to eastern Asia. These relationships are represented, respectively, in Fig. 439 by the tracks linking (1) the upper Yukon River valley with northeastern Siberia, and (2) Attu Island with Kamchatka (lower track only). These tracks represent the seventh and eighth individual tracks among Nebria which cross the North Pacific. Taken together, these form a significant generalized track; but it is not safe to assume that all these tracks relate to the same historical events and are therefore of equivalent age. Evidence to the contrary is presented in section 4.23.

Within North America, vicariance relationships among sister groups are as follows: (1) The kincaidi and ovipennis infragroups are north/south vicars. A track connecting their respective ranges (Fig. 438, broken line) links the Cascade Range of northern Oregon with the Sierra Nevada. This pattern is coincident with patterns for two sister species pairs (see above). (2) The schwarzi and trifaria subgroups demonstrate north/south (and to some degree coastal/inland) vicariance (this track not illustrated), although the ranges of single species in each group do overlap in northwestern Wyoming. (3) Two pairs of groups demonstrate east/west vicariance relationships. The desolata and eschschooltzii infragroups represent vicars on opposite side of the southern end of the Great Basin. In Fig. 438, this track is represented by the broken line linking the southern Sierra Nevada

with the southwestern corner of the Colorado Plateau. (4) The gregaria subgroup (including N. angustula, known only from Kamchatka) and the arkansana subgroup are sister groups which demonstrate vicariance between continental shelf and inland (Rocky Mountain) areas (this track is not illustrated). This vicariance pattern is unique in that, unlike the generalized track evident across the Okanagan lowland it does not include the coastal ranges of the mainland (e.g. Coast Mountains, Cascade Range, etc.) but, rather, bypasses them entirely.

4.223 Nebria fossils and past distributions

Fossil specimens indistinguishable from members of extant taxa provide a unique opportunity for studying past distributions of organisms and paleoenvironments (Coope, 1970a). Based on the assumption that habitat distributions of most taxa remain constant over considerable time intervals (principle of uniformitarianism), we can use our knowledge of present environmental relationships of living taxa to reconstruct past environments. Of greatest importance in present context, however, is the use of fossils in describing past distributions. Known fossil specimens referable to Nearctic Nebria taxa were discussed above (section 3.24). I here review distributional data they provide.

Among fossil specimens discovered to date, adults of the following extant species appear to be represented: N. nivalis, N. suturalis, and either N. pallipes or N. lacustris (see section 3.24 for discussion of these specimens). Two apparent records for N. nivalis are widely separated in time and location. The earliest

record is of Tertiary age (ca. 5.7 million years B.P.), from Lava Camp mine, Seward Peninsula, Alaska (Hopkins et al., 1971)--an area within the present range of this species. The second record is apparently of early Wisconsinan age (ca. 70,000 years B.P.), from the Scarborough Formation (Morgan, 1972), Toronto, Ontario. This locality is well outside the present geographical range of the species (Fig. 385; locality for fossils is marked by an "X"). Implications of the record are that (1) in early Wisconsinan time, the range of N. nivalis extended (and was probably displaced) much further south than at present, at least as far as the lower Great Lakes area; and (2) the regional environment was equivalent to that of Arctic/Alpine or upper Hudsonian Zone areas at present. N. suturalis was also represented in the Scarborough fauna. Limits to its present geographical range (Fig. 398; locality for fossils is marked by an "X") do not include the Toronto area; and the scenario suggested based on its occurrence at Scarborough is identical with that based on the N. nivalis record. It is interesting to note that, although N. nivalis and N. suturalis appear to occur together in the fossil assemblage, they are not yet known to co-exist in any locality at present. This may well be due to incomplete sampling in crucial areas (e.g. in coastal Labrador, where representatives of both species have been found).

Fossil specimens tentatively identified as either N. pallipes or N. lacustris have been recovered from the Don Formation (also in the Toronto area), which apparently represents an assemblage of Sangamon (interglacial) age (ca. 100,000 years B.P.) (A. Morgan, personal communication). Present geographical ranges of both species reach their northern limit in this general area; and it is likely that at

the time the fossils were deposited, regional environment of the area was similar to that at present or slightly warmer.

4.224 Habitat distributions; altitudinal zonation patterns

In preceding sections, I have tried to integrate data on habitat distributions with data on geographical distribution in an attempt to simulate the third dimension to Nebria distribution--namely, altitude. Reasons for reference to life zones rather than to altitude ranges per se in all preceding sections have been discussed above (section 3.231). In this section, I discuss the relationship between life zone range and geographical range in general, and then present examples of altitudinal zonation patterns among Nebria taxa in certain mountain ranges.

Relationship between life zone range and geographical range.--It seems appropriate to assume that, in general, taxa with broad macrohabitat (life zone) ranges should demonstrate broader geographical ranges than taxa with more restricted macrohabitat ranges. To test the validity of this assumption, I examined this relationship statistically, using data from Table 6 (on the maximum linear extent of geographical ranges) and Table 8 (on life zone distributions). Correlation coefficients were calculated (X = maximum linear extent of geographical range in kilometers, and Y = life zone range [number of life zones occupied]) for different samples: first those composed only of species level taxa, then those including species and subspecies level taxa. Results of these tests indicate that the assumed relationship is supported, but very poorly, by Nebria distributions. For example, the

correlation coefficient (r) for these two variables over the sample including all species equals 0.2797 (where $N = 42$; $\text{mean}_x = 2439$ km, $\text{S.D.}_x = 4255.7$; $\text{mean}_y = 2.26$ life zones, $\text{S.D.}_y = 0.964$) and $0.1 > p > 0.05$. For the sample including both species and subspecies, $r = 0.2358$ ($N = 68$; $\text{mean}_x = 1339$ km, $\text{S.D.}_x = 2342.3$; $\text{mean}_y = 2.09$ life zones, $\text{S.D.}_y = 0.958$) and $0.1 > p > 0.05$. In an attempt to explain the rather poor test results, I applied the same tests to selected subsets of the data--namely (1) the northern taxa (those restricted to, or most widespread in, high latitude areas) alone; and (2) the southern taxa (those restricted to areas south of 49° N latitude) alone. Tests on samples using southern taxa alone produced slightly higher correlation coefficients (for species only, $r = 0.4596$ [$N = 19$; $\text{mean}_x = 406$ km, $\text{S.D.}_x = 471.2$; $\text{mean}_y = 2.05$ life zones, $\text{S.D.}_y = 0.970$], which is barely significant at $p \leq 0.05$; for species and subspecies, $r = 0.5589$ [$N = 41$; $\text{mean}_x = 286.1$, $\text{S.D.}_x = 370.2$; $\text{mean}_y = 1.95$, $\text{S.D.}_y = 0.9988$], which is significant at $p \leq 0.001$). Results obtained in the test using northern species and subspecies were similar to those for southern species alone; but the test on northern species alone yielded a correlation coefficient equal to 0.8490 ($N = 6$; $\text{mean}_x = 9203$, $\text{S.D.}_x = 8489.7$; $\text{mean}_y = 2.0$, $\text{S.D.}_y = 1.095$) and $0.01 > p > 0.001$.

Why is the assumed relationship poorly, or at least unequally, supported by the data in general, and best supported by data from the northern species sample? Is it due to the small sample size of the latter and, hence, not really support at all? No! Northern species are the only taxa which occupy areas which offer relatively continuous macrohabitats (i.e. the Hudsonian and Arctic Life Zones). Only at

high latitudes are the effects of discontinuity in macrohabitat minimized. Taxa which are restricted to lower latitudes, even those which occupy broad life zone ranges in particular mountain ranges, are prevented from attaining broad geographical ranges at present by gaps in the range of the lowest life zone they occupy. The only exceptions are those taxa (e.g. N. obliqua) which have such low limits to their life zone ranges (e.g. in Transition or Upper Sonoran Zones) that gaps are either absent or relatively easily bridged (e.g. with slight shifts in climate). Present geographical and habitat distributions have also been determined, at least in part, by historical events; but because of the physiographic pattern of North America, discontinuities in macrohabitat suitable for most Nebria would be relatively more significant in lower latitudes under any set of climatic events likely to occur.

In summary, I have not been able to adequately demonstrate a direct relationship between extent of geographical range and extent of life zone range, although I still maintain that this relationship must, in general, apply. Failure to clearly demonstrate this relationship is testimony to the complex interplay of past and present factors which have affected distributions of Nearctic Nebria.

Altitudinal zonation patterns.--As noted in section 3.2311, overlap of geographical ranges and diversity in macrohabitat ranges among Nebria taxa result, in some areas, in classic altitudinal zonation patterns. Altitudinal ranges are difficult to define, mainly because they differ significantly with relatively minor shifts in latitude, longitude (i.e. from coastal to inland areas), and exposure (north versus south slopes of mountains). Too many independent environmental factors

affect altitudinal range to make geographically broad generalizations possible (except, as above, by reference to life zone ranges).

Patterns such as those recognized below can, therefore, be recognized only for limited geographical areas. Among such studies on altitudinal zonation in insects are those of Armin (1963) and Haubold (1951) on the Carabidae of Boulder County, Colorado; Gregg (1947) on zonation in ants (Formicidae); Nebeker (1971) on various aquatic groups; and Nimmo (1971) on rhyacophilid and limnephilid caddisflies (Trichoptera) in the Alberta/eastern British Columbia Rocky Mountains. I present here altitudinal zonation patterns recognized among Nebria in four different montane areas.

First of these is the southern slope of Mount Rainier (Cascade Range, Washington). The pattern present is illustrated in Fig. 442; upper half). Altitudinal ranges of 12 taxa are represented in the figure; and considerable overlap of altitudinal ranges of different taxa is apparent. At certain altitudes, several taxa are represented. Maximum diversity occurs at the 1300 to 1400 m level, roughly equivalent to the area of transition between Canadian and Hudsonian Zones. The second area is the western slope of the Sierra Nevada in the area within and around Yosemite National Park, California. The zonation pattern present is illustrated in Fig. 442; lower half). The fauna of this area is less diverse (only eight taxa represented) than the Mount Rainier fauna, but it covers a broader altitudinal range (namely, 400 m to about 3600 m) than the latter (0 m to about 2800 m). There are two taxa shared with the Mount Rainier fauna (N. eschscholtzii and N. acuta acuta), both of which have their altitude ranges shifted upward in the Yosemite area. Peak diversity in this

fauna is at the 3400 m level (in the Arctic/Alpine Zone) where four taxa are represented. The third area is the Front Range (eastern slope) of the Rocky Mountains in Colorado. The zonation pattern, illustrated in Fig. 443 (upper half), involves eight taxa. Maximum diversity is at about the 2900 m level (in the Hudsonian Zone). The last area is the Sangre de Cristo Range (north slope) in the Rocky Mountains of northern New Mexico. The zonation pattern is represented in Fig. 443 (lower half). Only four taxa are represented, and all are shared with the fauna of the Front Range. Because given life zones occupy increasingly higher altitudes in transects from north to south (e.g. see Mani, 1962), altitudinal ranges of these taxa should be displaced upward in the Sangre de Cristo Range if the macrohabitat ranges of the taxa are equivalent in all areas. In this instance however, the opposite is true--the respective altitudinal ranges of three of the four taxa are displaced downward in relation to ranges of populations in the Front Range. Of particular interest is the altitudinal range of N. purpurata in New Mexico. It is so far displaced as to be below, and non-overlapping with, that of Front Range representatives. Maximum diversity for the fauna is at the 2500 m level (Canadian Zone), where all four taxa are represented. These same four taxa do not quite overlap in the Front Range; but if the range of N. obliqua extended high enough, the four would co-exist only as low as the 2800 m level.

Clearly, members of the Sangre de Cristo fauna, except N. obliqua (which demonstrates the expected range in relation to Colorado populations), have peculiar altitudinal distributions. In an attempt to interpret the unexpected downward displacement of these ranges, I

can suggest only one scenario consistent with these findings. Populations isolated in this mountain range, when confronted with a trend toward warmer temperatures than at present were forced to retreat upward with other cool-adapted members of the biota. The warming trend suggested may correspond to the so-called "altithermal" (or "hypsiethermal") period (variously placed at between 5000 and 7000 years B.P.; see Richmond, 1965). [Existence of this warm period is questioned, however, by some workers for certain parts of the southwest (e.g. Martin and Mehringer [1965] doubted its significance and/or existence in southern Arizona and New Mexico)]. In the face of continued warming, populations already displaced to highest elevations were, in effect, forced right off the tops of the mountains. This could account for the absence of N. suturalis and N. trifaria from the fauna. Apparently populations which were able to survive this period did so by acquiring adaptations to life in a warmer climate. As climate again cooled, these populations were able to shift their ranges down the mountains. If survival in the warm climate had been achieved at the expense of certain genetic variability within the populations, specifically that portion related to adaptation for life in cool climate, resulting altitudinal ranges of these taxa could remain displaced below their original levels. The present altitudinal ranges of N. purpurata, N. gyllenhali lindrothi, and N. arkansana arkansana may well reflect the above sequence of events.

4.225 Range size, disjunction, and dispersal

I have reviewed factors affecting certain aspects of distribution

(especially geographical isolation and extent of geographical range) of Nebria taxa in a separate paper (Kavanaugh, in press B). I here summarize some results of that study--namely those which bear on the relationship between apparent dispersal capability and distribution.

As noted above, members of all taxa appear to have approximately equal ambulatory capabilities. Differential dispersal capability is therefore dependent on differences in either flight capability of individuals or the intrinsic disposition of individuals for ambulatory movement, or on both (assuming that environmental constraints are not completely limiting factors). I have no comparative data at present on the relative dispositions of members of various taxa for movement. I therefore limit discussion here to apparent differences in flight capability (see section 3.234 for detailed discussion of this topic).

A highly significant difference ($P \geq 0.99$) found in mean maximum linear extent of geographical range between taxa with fully-winged members and those with all members having reduced hindwings was noted above (section 3.2342). This suggests that the flight capability of its members, as judged by wing size, may affect (1) the rate at which the range of a taxon may expand (extrinsic dispersal), and/or (2) the maximum size of range that it may occupy yet still maintain minimum genetic continuity (through internal dispersal). Support for hypothesis (1) has already been presented (section 3.2342). Ninety-one percent of the 22 Nebria taxa represented in areas which were completely covered by Wisconsinan ice sheets have members with full-sized hindwings. This implies that these taxa have, in general, been able to invade deglaciated regions more rapidly than taxa with all members having reduced hindwings. A first assumption, therefore,

is that flight capability has been important for the apparent success of rapidly expanding taxa (although explanation for same is undoubtedly not this simple). It is more difficult to test hypothesis (2) above in the absence of data on minimum gene flow required to maintain continuity and on the frequency and duration of and distance covered in flight. For an (admittedly) indirect test, however, I used data from Table 7 on significant disjunctions in the geographical ranges of taxa and tried to relate these to flight capability. I first assumed that taxa whose members have full-sized hindwings would be able to accomodate larger disjunctions within their geographical ranges than taxa those whose members all have reduced hindwings. I based this assumption on the idea that, although some large gaps in present distributions may never be crossed under present climatic conditions, even by strong fliers, shifts in climate which could reduced the gap distance would first (and probably also more frequently) benefit fliers by permitting more frequent gene flow between populations. Statistical treatment of the data indicates that, although mean size of significant disjunctions among the ranges of taxa with fully-winged members (334.6 km) is more than twice as large as the mean disjunction size among taxa with short-winged members only (151.3 km), these sample means are not significantly different (except at $P \leq 0.30$ [T value = 1.082 (with 29 degrees of freedom)]. Variance in gap size is simply too great to provide support for the assumption.

Factors other than gap size must also influence gene flow between and/or differentiation among isolated populations. This latter point is demonstrated by an observation made elsewhere (Kavanaugh, in press

B), that there is no significant difference between mean gap distance separating significantly disjunct populations assigned to single taxa and mean gap distance between populations assigned to different subspecies. The role of flight in maintaining gene flow between disjunct populations, and in internal dispersal in general, is therefore not clarified by the above test.

4.226 Relationship between life cycle timing and distribution

As noted above (section 3.2322), relationships have been suggested between altitudinal and geographical distributions of carabid species and timing of their life cycle (e.g. Greenslade, 1965; Lindroth; 1949). Overwintering stage appears to be a most critical factor in relation to distribution (see above). Lindroth (1949) noted that species of Scandinavian carabid beetles members of which overwintered as larvae tended to be restricted to coastal regions--that is, to areas with a maritime climate. Such areas experience relatively mild winters, and are, therefore, perhaps more favorable to insects in the larval stage at that time. Similarly, low altitude and low latitude areas provide mild winter conditions compared with such conditions in corresponding high altitude and latitude areas. Similar concentrations of taxa which overwinter as larvae could then be expected in the former areas. I have tested these hypotheses for Nearctic Nebria using data presented in Table 13 on life cycle timing and data on the geographical and macrohabitat distributions of taxa. Results of these tests are summarized below.

The association noted by Lindroth (1949) between larval

overwintering and maritime climate is demonstrated also among Nearctic Nebria. Of the 17 taxa all or most members of which overwinter as larvae, 15 (88%) have geographical ranges associated with areas having maritime climates. Only 5% of the taxa occupying high altitude areas have members which overwinter as larvae (and this represents only 11.5% of all taxa with larvae which overwinter). Suggested relationships between larval overwintering and both maritime climate and low altitude are supported by data on Nebria taxa. I could find no such relationship, however, between latitude and overwintering stage. Although 64% of the taxa represented in northern areas have members which overwinter as adults, 24% of all taxa in which larvae overwinter are represented in these areas compared with representation by only 18.8% of all taxa in which adults overwinter.

Life cycle timing appears to be related to both altitudinal and longitudinal (coastal versus inland) distribution; but whether or not this relationship is one of cause and effect is yet uncertain. If my interpretation of evolution in Nebria overwintering stage (character no. 171, Table 15 and Fig. 372) is correct, the plesiotypic character state is 'overwintering in the larval stage'. If phylogenetic relationships proposed by the cladogram (Fig. 372) are correct, overwintering in the adult stage by all or most individuals of a taxon has evolved independently at least eight times, and by some individuals of a taxon at least five more times. This suggests that overwintering stage is a character subject to change, perhaps in response to selection for adaptation to life in areas with cold winters. However, shifts from larval to adult overwintering, and vice versa, are not universally as expected. For example, all or most

members of all taxa in the metallica lineage overwinter as adults, even though some member taxa are restricted to coastal (maritime) areas (e.g. N. meanyi meanyi); and N. crassicornis intermedia members overwinter as larvae and yet have a Rocky Mountain (i.e. continental) distribution). In some instances at least, it appears then that overwintering stage characteristics inherited from a common ancestor may be retained unchanged by descendant taxa regardless of their geographical range.

4.23 Historical zoogeography

This section has been omitted from the dissertation, but it will be included in the manuscript for publication. In this section, I will apply clues provided by the preceding study on present Nebria distribution to reconstruction of past distributional history of the genus in North America. I intend to organize the discussion as outlined below.

4.231 Introduction to historical biogeography: goals, principles, techniques, assumptions.

4.2311 "Vicariance" and "dispersal" biogeography--two sides of the same coin.

4.232 Overview of Cenozoic history of the Holarctic Region.

4.2321 Progressive changes in physiography and climate.

4.2322 Cyclic changes in physiography and climate.

4.233 Cenozoic history of Nearctic Nebria.

4.2331 "Post-Glacial" history.

4.23311 Dispersal, and other changes in geographical range

4.23312 Historical development of of present vicariance patterns.

4.23313 Speciation, subspeciation, and differentiation in post-glacial time.

4.23314 Nebria distributions and the "hypsithermal interval.

4.2332 Nebria distribution and Wisconsinan Glaciation

4.23321 "Glacial refugia" and other changes in geographical range.

4.2333 Sangamon interglacial and distributions of Nebria.

4.23331 Speciation and differentiation in post-Illinoian time.

4.2334 Illinoian Glaciation and Nebria distributions.

4.23341 Maximum range extension of cold-adapted organisms.

4.2335 Pre-Illinoian history and the origins of Nearctic Nebria.

4.23351 Vicariance patterns and distributional history of Nearctic Nebria and their Palaearctic relatives.

4.3 Compatibility between proposed phylogeny and historical zoogeography.

This section has also been omitted from the dissertation, but it will be included in the manuscript for publication. If certain phylogenetic relationships suggested by the cladistic analysis do, in fact, accurately reflect evolutionary history, then distributional histories of certain taxa have been more complex than other sets of relationships suggest. In this section, I will examine these complex reconstructions and consider alternative sets of relationships which might permit simpler explanations for observed distributional patterns.

4.4 Evolutionary trends

This section has been omitted from the dissertation. For publication, I will include here discussion of trends in structure, geographical and habitat distributions, and life history among Nearctic Nebria. I have discussed evolutionary rates and factors affecting same elsewhere (Kavanaugh, in press B), but will summarize my findings here also.

5.0 PROSPECTUS

In preceding sections, I have reviewed the history of Nearctic Nebria systematics and presented results of my own studies to date. It seems appropriate in closing to make some suggestions from my present perspective concerning possible directions for future studies on this interesting group of beetles. I hope to follow some of these suggestions myself and will welcome the help of others in doing so. Perhaps what I have presented above will encourage others to take up some studies on Nebria which will utilize their own special skills and interests.

5.1 Geographical distributions and undescribed taxa

Some parts of North America are not yet adequately sampled for presence of Nebria populations; and it is in these areas that future field work and collections may be most profitable. There are probably few if any Nebria species yet to be discovered, even in these areas; but important information on geographical variation patterns and range limits of several species and on the geographical relations of certain subspecies can be obtained from additional work in these areas.

In eastern North America, the Nebria fauna comprises few species, the respective distributions of which are relatively well-known. However, the recent discovery of certain West Virginia populations of N. pallipes, members of which are unusually small and have dark appendages (see species description), suggests that more field work in that state may be needed. Similarly, some of the high mountains of Virginia (e.g. Mount Rogers) have not yet been adequately sampled for

Nebria species, particularly for presence of N. appalachia populations. Additional work on the geographical distribution of this species should also include careful search in all the isolated mountain ranges further south, including on the highest "balds" in northern Georgia.

Representatives of Nebria species have not yet been found in the Ozark mountain system; but the occurrence of relict populations there is still a possibility. Careful search of suitable habitats in the Ouchita Mountains and Boston Hills may yet disclose their presence in that area.

A search for Nebria populations is needed in several areas of western North America. Sampling in the Capitan and Sacramento Mountains of southcentral New Mexico has been negligible; and more fieldwork is needed in the Sangre de Cristo Range further north. The Chuska Mountains of northeastern Arizona may also yield interesting Nebria specimens; and fieldwork throughout the canyonlands of northern Arizona and southern Utah may better define the geographical range limits and variation patterns of N. desolata and N. navajo. Mountain ranges in Utah which require additional sampling include the Uinta, Pavant, Pine Valley, and central Wasatch Mountains. The Gros Ventre and Wind River Ranges of Wyoming have also been inadequately sampled.

Data on distributions and diversity of species in the Sierra Nevada of California are yet incomplete. Members of several taxa (e.g. N. lyelli and N. meanyi lamarckensis) are known from only one or a few localities; and their respective geographical ranges may be somewhat larger. Additional collections may help to clarify geographical relations of different subspecies of N. ingens and N.

spatulata and the pattern of geographical variation in N. ovipennis.

Areas of particular interest in the Pacific Northwest include the Olympic Peninsula and Vancouver Island, high altitude areas of which have not been adequately sampled, Cascade Range north of Snoqualmie Pass (Washington), Coastal Ranges of British Columbia (north of Vancouver) and southeastern Alaska, and the Queen Charlotte Islands. Geographical relations between N. crassicornis crassicornis and N. crassicornis intermedia and between N. gebleri gebleri and N. gebleri cascadiensis are presently unclear; but these may eventually be clarified through sampling in the mountainous area between Vancouver and Terrace, British Columbia. The Nebria fauna of the Queen Charlotte Islands is not yet fully known. Nebria charlottae was described from a single specimen collected over 100 years ago, and its continued presence and (if applicable) its geographical and habitat distributions must be established through field studies in the Islands. High altitude areas in the Coastal Ranges of southeastern Alaska should be sampled for relict Nebria populations, ancestors of which may have survived glacial periods in nearby coastal refugia (see above).

5.2 Future directions in Nebria systematics

Comparative studies which remain to be made on Nearctic Nebria are many and varied, limited only by availability of techniques needed to accomplish them and willingness of workers to begin them. Each additional study should exploit a new set of characters and provide new data on phylogenetic relationships among species; and each should, therefore, permit new tests of hypotheses of relationship based on

results of all previous studies.

Characters of external structure of adults which I have not yet exploited adequately include those of the mandibles, maxillae, and internal sac of the male median lobe; and these should be especially useful in defining and testing relationships among species groups and subgroups. Study of several internal organ systems (especially the digestive and reproductive systems) in adults may also provide pertinent data. I anticipate that comparative studies of external structure of eggs, larvae, and pupae will generate data of use in testing hypotheses of relationship based on characters of adults; but again, I suggest that results will be useful mainly for tests of supraspecific relationships.

External structure of adults is the character system used classically for comparisons among and characterizations of members of different taxa. Unfortunately, data from such studies do not always permit unequivocal determinations of relationships among taxa or populations considered; and at some point in any study, the usefulness of this (or any other) character system is bound to reach its limit. I suggest that this point has been reached in Nearctic Nebria systematics, and that, except for use of mandibular and other characters noted above, little more will be gained from further study of adult external structure. This may be especially true for determination of relationships among populations and subspecies. For example, relationships among various populations of N. arkansana and of N. fragilis are extremely complex; and data on external structure appear inadequate to permit clear choices among alternative sets of relationships.

I am convinced that data from other character systems, such as those derived from comparative biochemical and/or serological studies, will be needed, in many instances, to permit adequate recognition of relationships among populations. In particular, I suggest that comparative biochemical studies (using one of several techniques available) will be very useful in exploring relationships among member species and subspecies of the gregaria lineage (especially relationships between N. gregaria and N. sahlbergii sahlbergii in the Aleutian Islands; between N. arkansana edwardsi and N. sahlbergii sahlbergii in western Alberta and eastern British Columbia [see discussion above under species descriptions]; and between N. arkansana and N. fragilis. Similar studies on populations of members of the trifaria infragroup may help to determine relationships among these taxa also, whereas other studies to date have not led to completely satisfying conclusions (see above).

Comparative natural history studies should yield abundant data, useful in both testing of hypotheses on phylogenetic relationships and in promoting a more complete understanding of the role of these beetles in their environment. Of particular importance are studies on nocturnal microhabitat preferences (see above) and mating behavior, especially possible mechanisms for species recognition. Because members of several different Nebria species are frequently found hiding together during the day in some areas, unique nocturnal foraging areas (microhabitats) or strategies as well as some means of recognizing members on their own species might be expected. If discovered, such characteristics might be useful in defining both phylogenetic and environmental relationships among species.

The classification of Nearctic taxa presented here must be considered tentative, pending a reclassification of the genus worldwide. Future comparative studies among members of the genus should, as far as is possible, adopt a worldwide perspective. As noted above, relationships among Nebria, other nebrini genera, and genera in related tribes (e.g. Notiophilus) are not yet clearly defined. Determination of these relationships must be given highest priority among the future goals of Nebria systematics.

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SPECIES NAME	DESCRIPTOR	DATE:PAGE	STATUS	COLLECTION
<u>Nebria acuta</u>	Lindroth	1961:71	holotype	MCZ
<u>Nebria aleuta</u>	Van Dyke	1924:5	holotype	CAS
<u>Nebria appalachia</u>	Darlington	1931:153	holotype	MCZ
<u>Nebria arkansana</u>	Casey	1913:52	lectotype	USNM
<u>Nebria balli</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria bellorum</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria beverlianna</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria bifaria</u>	Mannerheim	1853:120	lectotype	ZILR
<u>Carabus brevicollis</u>	Frabricsius	1792:150	lectotype	ZMKD
<u>Nebria brevis</u>	Casey	1913:55	lectotype	USNM
<u>Nebria carri</u>	Kavanaugh	n. sp.	holotype	CAS
<u>Nebria cascadenis</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Helobia castanipes</u>	Kirby	1837:20	lectotype	BMNH
<u>Nebria catenata</u>	Casey	1913:49	lectotype	USNM
<u>Nebria charlottae</u>	Lindroth	1961:67	holotype	CNC

SPECIES NAME	DESCRIPTER	DATE:PAGE	STATUS	COLLECTION
<u>Nebria coloradensis</u>	Van Dyke	1943:19	holotype	CAS
<u>Nebria columbiana</u>	Casey	1913:48	holotype	USNM
<u>Nebria corvallis</u>	Casey	1924:20	lectotype	USNM
<u>Nebria crassicornis</u>	Van Dyke	1925:121	holotype	CAS
<u>Nebria cuneata</u>	Casey	1913:50	lectotype	USNM
<u>Nebria curtulata</u>	Casey	1924:20	lectotype	USNM
<u>Nebria darlingtoni</u>	Kavanaugh	n. sp.	holotype	CAS
<u>Nebria desolata</u>	Kavanaugh	1971:41	holotype	CAS
<u>Nebria diversa</u>	LeConte	1863:2	lectotype	MCZ
<u>Nebria edwardsi</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria elias</u>	Motschulsky	1865:275	type lost	ZMUM
<u>Nebria eschscholtzii</u>	Menetries	1844:55	lectotype	ZILR
<u>Nebria expansa</u>	Casey	1913:56	lectotype	USNM
<u>Nebria femoralis</u>	Motschulsky	1859:244	lectotype	ZILR
<u>Nebria femorata</u>	Motschulsky	1865:275	lectotype	ZILR
<u>Nebria formalis</u>	Casey	1920:153	lectotype	USNM

SPECIES NAME	DESCRIPTOR	DATE:PAGE	STATUS	COLLECTION
<u>Nebria fragilis</u>	Casey	1924:21	lectotype	USNM
<u>Nebria frigida</u>	Sahlberg (R.F.)	1844:11	lectotype	UMTF
<u>Nebria gaspesiana</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria gebleri</u>	Dejean	1831:573	holotype	MHNP
<u>Nebria gouletti</u>	Kavanaugh	n. sp.	holotype	CAS
<u>Nebria gregaria</u>	Fischer v. Wald.	1821:72	lectotype	ZMUM
<u>Carabus gyllenhalii</u>	Schönherr	1806:196	lectotype	NRSS
<u>Nebria hippisleyi</u>	Casey	1924:21	holotype	USNM
<u>Nebria hudsonica</u>	LeConte	1863:3	lectotype	MCZ
<u>Nebria incerta</u>	Casey	1913:53	lectotype	USNM
<u>Nebria ingens</u>	Horn	1870:98	lectotype	MCZ
<u>Nebria intermedia</u>	Van Dyke	1949:49	holotype	CAS
<u>Nebria kincaidii</u>	Schwarz	1900:525	holotype	USNM
<u>Nebria labradorica</u>	Casey	1920:151	lectotype	USNM
<u>Nebria lacustris</u>	Casey	1913:56	lectotype	USNM
<u>Nebria lamackensis</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria lassenensis</u>	Kavanaugh	n. ssp.	holotype	CAS

SPECIES NAME

SPECIES NAME	DESCRIPTOR	DATE: PAGE	STATUS	COLLECTION
<u>Nebria lindrothi</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria livida</u>	LeConte	1859:84	lectotype	MCZ
<u>Nebria longula</u>	LeConte	1878:478	holotype	MCZ
<u>Nebria lyelli</u>	Van Dyke	1925:120	holotype	CAS
<u>Nebria mannerheimii</u>	Fischer v. Wald.	1828:253	lectotype	ZMUM
<u>Nebria manyi</u>	Van Dyke	1925:118	holotype	CAS
<u>Nebria melanaria</u>	Hatch	1949:115	holotype	UWBM
<u>Nebria metallica</u>	Fischer v. Wald.	1821:71	lectotype	ZMUM
<u>Nebria mobilis</u>	Casey	1913:50	lectotype	USNM
<u>Nebria modoc</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria moesta</u>	LeConte	1850:209	lectotype	MCZ
<u>Nebria mollis</u>	Motschulsky	1865:274	lectotype	ZMUM
<u>Nebria navajo</u>	Kavanaugh	n. sp.	holotype	CAS
<u>Nebria nimbosa</u>	Casey	1920:150	holotype	USNM
<u>Carabus nivalis</u>	Paykull	1790:52	lectotype	NRSS
<u>Nebria oasis</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria obliqua</u>	LeConte	1866:363	lectotype	MCZ

SPECIES NAME	DESCRIBER	DATE: PAGE	STATUS	COLLECTION
<u>Nebria obtusa</u>	LeConte	1878:478	holotype	MCZ
<u>Nebria oowah</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria oregona</u>	Casey	1913:52	lectotype	USNM
<u>Nebria ovipennis</u>	LeConte	1878:477	holotype	MCZ
<u>Nebria pacifica</u>	Chaudoir	1850:424	holotype	MHNP
<u>Nebria pallidissima</u>	Casey	1924:19	lectotype	USNM
<u>Nebria pallipes</u>	Say	1823:78	neotype	MCZ
<u>Nebria paradisi</u>	Darlington	1931:24	holotype	MCZ
<u>Nebria parvula</u>	Sahlberg (J.)	1885:47	lectotype	NRSS
<u>Nebria piperi</u>	Van Dyke	1925:117	holotype	CAS
<u>Nebria piute</u>	Erwin & Ball	1972:95	holotype	USNM
<u>Nebria prominens</u>	Casey	1920:151	lectotype	USNM
<u>Nebria pugetana</u>	Casey	1924:19	lectotype	USNM
<u>Nebria purpurata</u>	LeConte	1878:477	holotype	MCZ
<u>Nebria quileute</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria rathvoni</u>	LeConte	1853:400	holotype	MCZ
<u>Nebria raveni</u>	Van Dyke	1953:102	holotype	CAS

SPECIES NAME	DESCRIPTOR	DATE: PAGE	STATUS	COLLECTION
<u>Nebria reducta</u>	Casey	1920:150	lectotype	USNM
<u>Nebria riversi</u>	Van Dyke	1925:115	holotype	CAS
<u>Carabus rufescens</u>	Ströhm	1768:331	no type	----
<u>Nebria sahlbergii</u>	Fischer v. Wald.	1828:254	lectotype	UMHF
<u>Nebria schwarzi</u>	Van Dyke	1925:116	holotype	USNM
<u>Nebria sierrae</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria siskiyouensis</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria spatulata</u>	Van Dyke	1925:119	holotype	CAS
<u>Nebria strawberriensis</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria suturalis</u>	LeConte	1850:209	lectotype	MCZ
<u>Nebria sylvatica</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria teewinot</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria tenuipes</u>	Casey	1913:51	lectotype	USNM
<u>Nebria testaceipes</u>	Casey	1913:54	holotype	USNM
<u>Nebria tetonensis</u>	Erwin & Ball	1972:95	holotype	USNM
<u>Nebria texana</u>	Casey	1913:54	holotype	USNM
<u>Nebria townsendi</u>	Casey	1924:19	lectotype	USNM

SPECIES NAME	DESCRIPTOR	DATE: PAGE	STATUS	COLLECTION
<u>Nebria transversa</u>	Casey	1920:152	holotype	USNM
<u>Nebria triad</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria trifaria</u>	LeConte	1878:478	lectotype	MCZ
<u>Nebria uinta</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria utahensis</u>	Kavanaugh	n. ssp.	holotype	CNC
<u>Nebria vandykei</u>	Bänninger	1928:5	lectotype	ETHZ
<u>Nebria vandykei</u>	Darlington	1930:104	holotype	MCZ
<u>Nebria violacea</u>	Motschulsky	1850:73	lectotype	UMHF
<u>Nebria virescens</u>	Horn	1870:100	holotype	MCZ
<u>Nebria viridis</u>	Horn	1870:101	lectotype	MCZ
<u>Nebria wyeast</u>	Kavanaugh	n. ssp.	holotype	CAS
<u>Nebria zioni</u>	Van Dyke	1943:20	holotype	CAS

APPENDIX B: MATERIAL EXAMINED

Geographical and temporal specimen data are presented here to supplement the distributional maps and discussions for each species. In order to assist biologists interested in any studies of *Nebria* species, I have tried to present data in a manner which will facilitate location of appropriate populations. A number of comments should be made on the format and content of the data to allow for effective use of this appendix.

For convenience, the species and all data (including countries, states or provinces, counties, and localities) are arranged alphabetically. I agree with Lindroth (1969: xxix) that this format by itself fails to readily provide coherent pictures of species distributions. In concert with distributional maps, however, this format offers obvious advantages in ease of data retrieval.

All records are from specimens I have personally studied. Records solely from the literature are not included here. Certain literature records are, however, discussed in the text.

The use of the geographical subdivisions *county* (written "Co." in the listing) or *comté* ("Cté" in the listing) are used where possible as an aid in organizing the data. Provinces and states for which these subdivisions are not used include Alberta, British Columbia, Manitoba, Saskatchewan, Yukon Territory, and Alaska. In this appendix, all national parks are treated as counties; and all localities within park boundaries are listed under the park rather than under their appropriate counties.

Because altitude data are often important in defining the habitat

ranges of *Nebria* species, these data are recorded here where possible. No attempt has been made, however, to present altitude data not actually recorded on the specimen labels. Where necessary, altitude values have been converted to their metric equivalents.

Only the months in which specimens were actually collected at a given locality have been noted here. This level of exactness adequately describes the temporal distributions of most samples. The addition of year and day data would have expanded this already large appendix tremendously and for minimal added value. For similar reasons, collectors' names have been omitted. In this latter omission, I do not intend to ignore the essential contributions of the many collectors whose personal efforts have added greatly to the scope of this study; and I regret that recognition of their assistance must be confined to the Acknowledgments section of the text.

The collections in which specimens are deposited are noted, but holdings for each are not itemized. Some specimens reported here to be in my personal collection have actually been distributed among various individuals and institutions; and no mention is made of these transfers except where type series are involved (refer to descriptive section under each taxon).

A number of specimens were found to be inadequately or ambiguously labelled. Where possible, I have clarified these records, without making note of the corrections in the listing. In each instance, however, there is no doubt in my mind as to the correctness of my assignments. Specimens with illegible or essentially meaningless locality labels are grouped with specimens bearing no locality labels in the category *No Data*.

Specimens listed in the category *Doubtful Records* are of two types: (1) those labelled as from localities outside the known and probable ranges of the taxon; and (2) those labelled as from localities within the known range of the species but from areas where I am certain no suitable habitat exists. However, for some specimens in category (2) where appropriate habitat can be found within reasonable proximity of the stated locality, I have chosen to add the word *area* after the entry (as in Portland *area*). Although imprecise, this convention accommodates the common practice among some collectors of simply recording the nearest city or town on specimen labels rather than more precise locality data.

Nebria acuta Lindroth

Map: Figure 390

Nebria acuta acuta Lindroth

Specimens examined: 2224 (1040♂, 1184♀)

CANADA

BRITISH COLUMBIA: Chilkat Pass [June] (1; CNC), Clear Creek (Haines Highway mi. 61.3) [Aug.] (28; UASM), Garibaldi Provincial Park (south slope of Black Tusk [1830m-2040m], Whistler Mountain [1830m]) [July-Aug.] (181; CAS, CNC, DHKa), Lake Alice Provincial Park (0.2 mi. n. of Stump Lake at CheeKye River [100m]) [Aug.] (6; CAS, DHKa), Vedder River [July] (1; INHS).

UNITED STATES OF AMERICA

ALASKA: Big Boulder Creek (Haines Highway mi. 34) [June] (2; UASM), Cape Yakataga [June] (5; CAS, DHKa), Cooper Landing (Stetson Creek [670m]) [Aug.] (7; CNC), Little Boulder Creek (Haines Highway mi. 31) [June] (19; MCZ, UASM), Valdez (14 and 16 mi. e.) [Aug.] (55; CAS, MCZ, UASM, USNM), Worthington Glacier (Richardson Highway mi. 28.7) [Aug.] (24; MCZ, UASM). CALIFORNIA: Lassen Volcanic National Park, Mount Lassen (Lost Creek at Highway 87 [1840m]) [Aug.] (1; DHKa); Siskiyou Co., Mount Shasta (Mud Creek at Clear Creek [1880m]) [May, Aug.] (271; CAS, DHKa, USNM); Tuolumne Co., Chipmunk Flat [Aug.] (1; UCD). OREGON: Clackamas Co., Mount Hood (south slope near Timberline Lodge at headwaters of Salmon River [1830m-1950m]) [Aug.] (18; CAS, DHKa); Deschutes Co., Middle Sister Peak (east slope at North Fork Squaw Creek [1950m-2190m]) [Aug.] (112; CAS, DHKa), Soap

Creek ([1750m]) [Aug.] (15; CAS, DHKa), South Fork Squaw Creek (below Camp Lake [2130m]) [Aug.] (16; CAS, DHKa); Hood River Co., Elliot Branch Hood River (0.5 mi. w. of Cloud Cap Inn [1800m]) [Aug.] (6; OSUO), Hood River [July] (1; CAS), Mount Hood ([1740m], Sand Creek Tillie Jane Creek, White River [1380m], White River Glacier) [June-Aug.] (107; CAS, DHKa, KUSM, MCZ, UMI, UWEM); Marion Co., Mount Jefferson (north slope [1860m-1920m], northwest slope at Russell Creek [1680m-1740m], South Fork Breitenbush River in Jefferson Park [1770m], West Branch Whitewater River [1830m-1890m]) [Aug.] (62; CAS, DHKa, LRus). WASHINGTON: King Co., Snoqualmie (1; UWEM); Kittitas Co., Teanaway Ridge ([910m]) [July] (3; LRus); Lewis Co., White Pass (1.5 mi. w. at Millridge Creek [1280m]) [July] (18; DHKa); Mount Rainier National Park ([1830m]) [July-Sept.] (59; CAS, CUIC, JSch, LACM, MCZ, SJSC, UBC, USNM, UWEM, WSU), Carbon River (at Carbon Glacier) [Sept.] (1; UWEM), Fryingpan Creek ([1160m-1190m]) [July-Aug.] (43; CNC, DHKa, SJSC), Louise Lake ([1400m]) [July] (1; DHKa), Longmire [July-Sept.] (4; CAS, UWEM), McClure Rock ([2130m]) [Aug.] (2; CAS), Narada Falls ([1370m]) [July] (9; USNM, UWEM), Nisqually River (Cougar Rock Campground [960m], near Longmire, at toe of Nisqually Glacier [1190m-1520m], 0.1 mi. above Paradise River [980m]) [July-Sept.] (524; CAS, DHKa, MCZ, MSU, UWEM), North Fork Puyallup River ([1130m], at toe of Puyallup Glacier [1100m-1650m]) [Aug.] (249; CNC, DHKa), Ohanapecosh [June] (1; ROM), Paradise area (Edith Creek Basin [1710m-1920m], Paradise Glacier, Paradise Park [1830m-2130m], Paradise River [1400m-1830m] (above Narada Falls [1400m-1460m], and below Sluskin Falls, Paradise Valley [1520m-1830m]) [June-Sept.] (225; CAS, CNC, DHKa, FMNH, LRus, UASM, USNM, UWEM), Sluskin

Falls [July] (15; UWEM), South Fork Puyallup River ([1070m]) [July] (2; UWEM), Stevens Creek ([1190m-1220m]) [June-July] (22; DHKa, USNM), Sunrise area [July] (36; CAS, LRus, USNM), Tahoma Creek ([840m]) [June] (1; USNM), Van Trump Creek (above Christine Falls [1220m-1280m]) [July] (8; DHKa), West End Road [July] (2; CAS), White River (at White River Campground [1190m-1520m]) [July-Aug.] (32; DHKa, FMNH, UWEM), Yakima Park [Aug.] (3; MCZ); Pierce Co., Ashford (4 mi. e. at Goat Creek on Nisqually River [590m]) [July] (4; DHKa), White River (at Silver Springs Campground [790m]) [Aug.] (1; DHKa); Skamania Co., Mount St. Helens (northeast slope above Timberline Campground [1340m-1500m]) [Aug.] (8; CAS, DHKa); Whatcom Co., Glacier [July] (1; CAS), Mount Baker (Austin Pass area [1190m-1310m], Chain Lakes, Heather Meadows area [1190m]) [Aug.] (18; CAS, DHKa, WSU); Yakima Co., Tieton Dam [Aug.] (1; PURC).

Doubtful Records. CANADA, YUKON TERRITORY: Swift River (Alaska Highway mi. 733.3) [Aug.] (1; LRus). UNITED STATES OF AMERICA, IDAHO: Bonneville Co., Idaho Falls (1; ICCM).

Nebria acuta quileute Kavanaugh, NEW SUBSPECIES

Specimens examined: 134 (80♂, 54♀)

UNITED STATES OF AMERICA

WASHINGTON: Olympic National Park [Aug.] (5; LACM, MCZ), Dosewallips River (at Mascott Campground) [July] (10; UWEM), Eagle Point ([1830m]) [July] (1; CNC), Olympic Hot Springs (Boulder Creek [610m-780m]) [May-Aug.] (117; CAS, CNC, DHKa, UIMI, UWEM), Sol Duc Hot Springs [June] (1; CAS).

Nebria appalachia Darlington

Map: Figure 397

Specimens examined: 274 (164♂, 110♀)

UNITED STATES OF AMERICA

NORTH CAROLINA: Great Smoky Mountains National Park, Fork Ridge ([1620m]) [Aug.] (1; DRWh); Newfound Gap ([1520m-1580m]) [Aug.] (32; AMNH, CAS, MCZ), Smokemont Loop Trail ([760m-910m]) [July] (1; UAFA); Haywood Co., Retreat [May] (1; USNM); Jackson Co., Fork Ridge (at Blue Ridge Parkway [1620m]) [June-July] (5; NMDo, RTBe), Waterrock Knob (3 mi. se. of Soco Gap [1620m-1680m], Scott Creek Overlook [1620m]) [May-July] (124; DHKa, HoKn, NMDo), Yellow Face ([1770m]) [July] (1; RCGr); Mitchell Co., Roan Mountain (1 mi. s. of Carver's Gap on Highway 261 [1550m]) [Sept.] (3; DHKa); Yancey Co., Mount Mitchell ([1520m-2040m] and southwest slope [1710m-1740m], summit) [May-June, Sept.] (79; DHKa, MCZ, USNM). TENNESSEE: Great Smoky Mountains National Park, Alum Cave Creek ([1160m-1310m]) [May] (7; DHKa), Chimneys area ([910m] and Chimney Tops Trail [1070m]) [May] (5; MCZ, USNM), Mount Leconte (and summit [2010m]) [May, Aug.] (8; AMNH, CUIC, USNM), Mount Guyot ([1200m] and Ramsey Cascade [1370m]) [Aug.-Sept.] (2; DHKa, USNM), West Prong Little Pigeon River ([1070m-1220m]) [May] (5; DHKa).

Nebria arkansana Casey

Map: Figure 392

Nebria arkansana arkansana Casey

Specimens examined: 2155 (1083♂, 1072♀)

UNITED STATES OF AMERICA

COLORADO: (1; INHS); Archuleta Co., East Fork San Juan River (3 mi. se. of Highway 160) [Aug.] (1; DHKa), Upper San Juan Valley ([2130m-3200m]) [Aug.] (4; AMNH, ANSP, MCZ, UASM); Boulder Co., Allenspark area (Big Gulch Mountain Brook [2930m]) [Aug.] (10; CArm, CUB), Arapahoe Pass ([2740m-3350m]) [Aug.] (8; ALar, RTBe), Brainard Lake [July] (2; DHKa), Lake Isabelle ([3170m]) [July] (1; CArm), Middle St. Vrain Creek ([2990m]) [July] (5; CArm), Niwot Ridge [July] (7; CArm, CUB, DHKa), South St. Vrain Creek ([3200m], above Mitchell Lake [3290m]) [July] (17; CArm, CUB), Ward ([3170m] and 5 mi. e. on Left-hand Creek) [July-Aug.] (81; CArm, DHKa, USNM), Yankee Doodle Lake ([3260m]) [Aug.] (2; UAFA); Clear Creek Co., Graymont (Clear Creek) [July] (8; DHKa, USNM), Leavenworth Valley ([3050m-3350m]) [June-July] (49; DHKa, USNM), Silver Plume ([2740m-3050m]) [June] (3; USNM), Stevens Gulch [July] (12; DHKa, USNM); Conejos Co., Cumbres Pass ([3050m]) [June] (1; CAS), Monkhaven (Conejos River) [June] (5; CAS); Costilla Co., Blanca Peak ([3810m]) [July] (14; BRot), Pass Creek (near La Veta Pass) [June] (1; BRot), San Francisco Canyon [June] (1; BRot); Custer Co., San Isabel (1.9 mi. sw. at St. Charles River [2710m-2830m]) [June] (147; DHKa); Dolores Co., Rico (Scotch Creek [2680m]) [July] (1; CNC); Eagle Co., Vail (5 mi. e. at Gore Creek [2740m]) [July] (11; DHKa, USNM); El Paso Co., South Cheyenne Creek (at Gold Camp Road [2530m-2650m]) [June, Aug.] (64; DHKa); Garfield Co., Hauskins Creek (23 mi. ne. of Buford [2910m]) [Aug.] (99; DHKa), Picket Pin Creek (21 mi. ne. of Buford [2870m]) [Aug.] (172; DHKa), Trappers Lake ([2990m]) [Aug.]

(14; DHKa); Gilpin Co., Pinecliffe (and 2.5 mi. w. at South Boulder Creek) [Aug.] (15; DHKa, UAFA), Rollinsville (9.1 mi. w.) [Aug.] (5; UAFA); Grand Co., Fraser River (above Robbers Roost Campground) [Aug.] (1; USNM); Huerfano Co., Blue Lake [June] (1; EAMa), Cucharas River (1.3 mi. w. of Highway 111) [June] (3; DHKa); Jackson Co., Agnes Lake [Aug.] (11; MSU, PURC), Cameron Pass ([3140m]) [Aug.] (2; UASM), Walden (4.9 mi. [2740m-3050m] and 7.4 mi. [3120m] se.) [Aug.] (2; UAFA); Lake Co., Independence Pass (5 mi. e. on Highway 82) [Aug.] (1; UAFA), Leadville [June] (3; CAS), North Fork Lake Creek ([3410m]) [Aug.] (115; DHKa), Twin Lakes (and 7 to 12 mi. w. on Lake Creek) [June, Aug.] (32; CAS, DHKa); La Plata Co., Durango area ([1680m-2130m]) [July-Aug.] (1; MCZ), Gold King Mill (Tirbircio Creek [2830m]) [Aug.] (10; UASM), Junction Creek [July] (2; USNM); Larimer Co., Cameron Pass [Aug.] (18; MSU, RTBe), West Fork Sheep Creek (at Crown Point Road [2900m]) (3; DHKa); Las Animas Co., Stonewall Gap (Middle Fork Purgatoire River [2500m]) [June] (10; DHKa); Mineral Co., Pagosa Springs (20 mi. n.) [June] (1; USNM), South Fork (4 mi. w. on Rio Grande River) [Aug.] (6; DHKa, EAMa), Wolf Creek Pass ([3350m-3410m] and 2 mi. w.) [June-Aug.] (101; BRot, CAS, DHKa, EAMa); Montezuma Co., Dolores River (at Highway 45) [Sept.] (3; CAS); Ouray Co., Ouray (and vicinity [2740m-3050m]) [July] (53; CAS, USNM); Park Co., Alma (South Platte River) [July] (1; EAMa), Como (5 mi. [3200m] and 7 mi. [3350m] w. at Tarryall Creek) (31; DHKa, EAMa), Middle Fork South Platte River (near Hoosier Pass [3510m]) [July] (26; DHKa); Pitkin Co., Aspen (and 8 mi. e. at Roaring Fork River) [July-Aug.] (4; AMNH, DHKa); Rio Grande Co., Summitville ([3050m-3510m]) [Aug.] (2; MCZ); Rocky Mountain National Park, Blue Lake [July] (12; RTBe), Chasm Fall Trail ([2870m]) [Aug.] (2; UAFA), Fall River

([2620m] and at Endovalley Campground) [Aug.] (40; RTBe, UASM), Fall River Road (1.7 mi. w. of Chasm Trail) [Aug.] (48; UAFA), Hang Lake [July] (13; RTBe), North St. Vrain Creek (at Ouzel Falls [2740m-3050m]) [July-Aug.] (52; CArm, DHKs, USNM); Routt Co., Rabbit Ears Pass [Aug.] (1; USNM), Steamboat Springs ([2070m]) [Sept.] (1; CAS); San Juan Co., Molas Divide ([3050m]) [Aug.] (10; PMCh, RDay), Red Mountain Pass (1 to 2 mi. s.) [Sept.] (3; CAS), Silverton area ([3050m]) [Aug.] (9; MCZ); San Miguel Co., South Fork San Miguel River ([2590m]) [July] (16; AMNH, ANSP, KSUC, MCZ, UMRM, USNM), Trout Lake (on Rico Road [2590m-3050m]) [July] (2; MCZ, USNM); Summit Co., Blue River (near Hoosier Pass) [Aug.] (4; USNM), Frisco (Tenmile Creek) [Aug.] (1; RDay), Monte Cristo Creek ([3350m]) [July] (9; DHKa), Quandary Peak (east slope [3410m-3960m]) [July-Aug.] (126; DHKa, USNM); County unknown, La Plata Mountains [July] (8; BRot), Whiskey Pass [June] (2; CAS). NEW MEXICO: (11; ANSP, CAS, ICCM, KUSM, MCZ, OSUC, USNM); Rio Arriba Co., Rio Puerco (at Rio Puerco Campground [2350m-2440m]) [June] (80; DHKa); San Miguel Co., Sapello (15.7 mi. w. on Highway 266 [2440m]) [June] (4; UASM), Winsor Creek ([2590m]) [June] (18; DHKa); Taos Co., Angostura Creek (0.3 mi. s. of Highway 3 [2710m]) [June] (3; DHKa), Red River (8 mi. s. on Red River [2870m]) [June] (8; DHKa), Tres Ritos [July] (3; CAS), Wheeler Peak ([3050m-3260m], Middle Fork Lake [3340m], Middle Fork Red River [3260m-3640m]) [June] (186; DHKa). UTAH: San Juan Co., Abajo Mountains [July] (1; BRot), Monticello (5 mi. [2590m] and 7.1 mi. [2830m] w. at North Creek, 5 mi. w. at Spring Creek [2500m], 10.1 mi. w. [3020m]) [July-Aug.] (134; DHKa, MCZ, UASM, USNM), Mount Linnaeus (east slope 12 mi. w. of Monticello [2740m-3050m]) [July-Aug.] (40;

DHka, UASM, USNM). WYOMING: Albany Co., Centennial (2.0 mi. nw. at Libby Creek Campground [2620m], 7.5 mi. nw. at Nash Fork Little Laramie River [2990m], University of Wyoming Science Camp) [July-Aug.] (56; DHka, MSU); Carbon Co., Haskins Creek (26 mi. ne. of Savery [2740m]) [July] (7; DHka), Hidden Treasure Gulch (11.5 mi. wsw. of Encampment [2870m]) [July] (6; DHka), Lake Marie ([3230m] and 8 mi. sw. [2740m]) [July] (27; DHka).

Doubtful Records. UNITED STATES OF AMERICA, ARKANSAS: (2; USNM).

COLORADO: Denver Co., Denver (1; ICCM). IDAHO: Nez Perce Co., Lewiston (1; ICCM). INDIANA: (2; USNM).

No Data. (1; USNM).

Nebria arkansana edwardsi Kavanaugh, NEW SUBSPECIES

Specimens examined: 1863 (1058♂, 805♀)

CANADA

ALBERTA: Banff National Park, Banff [Aug.-Sept.] (3; CUIC, UASM), Boom Lake ([1830m]) [July] (1; CNC), Bow Lake [Aug.] (1; UASM), Bow River ([1830m]) [Aug.] (6; CNC), Johnson Creek Trail (at Johnson Creek Campground) [July] (1; ROM), Lake Agnes [Aug.] (1; PMNH), Lake Louise [June-Sept.] (16; AMNH, CAS, CNC, MCZ, UBC), Ptarmigan Mountain ([2590m]) [Aug.] (13; CNC), Spray Lake [July] (1; JvMa), Sunset Pass ([1950m]) [Aug.] (4; CNC); Jasper National Park [Aug.] (2; AMNH), Amethyst Lake (and Amethyst Lake Trail [1710m]) [July] (10; DHka, UASM), Angel Glacier [Sept.] (1; RTBe), Hardisty Creek (1 mi. s. on Highway 93) [July] (1; RFre), Miette Hot Springs [Aug.] (1; RTBe), Miette River (at Meadow Creek [1100m]) [July-Aug.] (22; DHka, UASM),

Mount Edith Cavell ([1360m] and below Angel Glacier) [July] (3; DHKa, UAFA), Portal Creek Trail ([1950m]) [July] (3; USNM); Waterton Lakes National Park [July-Aug.] (5; UASM, UWEM), Red Rock Canyon [July] (2; CAS), Waterton Park (Cameron Creek)[July] (36; CNC, MCZ, UASM); Other localities, Bellevue (2 mi. w. at Gold Creek [1370m]) [July] (1; DHKa), Blackstone Gap [Aug.] (2; CNC), Blairmore (1; USNM), Blakiston Brook [July] (10; UASM), Carbondale River (near Lost Creek) [Sept.] (1; DJLa), Cline River (at Highway 11) [Aug.] (2; DHKa), Gap [Aug.] (1; CAS), Gorge Creek [July] (2; UASM), Happy Valley (Pincher Creek) [Aug.] (11; CAS, UASM), Highwood Pass ([2380m]) [July] (15; CNC), Highwood River [Aug.] (1; CAS), Marmot Creek (10 mi. sw. of Kananaskis Forest Experiment Station [1520m]) [Aug.] (10; CNC), Mill Creek Ranger Station [Aug.] (2; CAS), Pincher Creek ([1620m]) [July] (3; DJLa), Ram River area [July] (2; BFCa), Sheep River (4.5 mi. above Gorge Creek) [Aug.] (7; DHKa), West Branch Castle River ([1340m]) [Aug.] (6; DJLa).

BRITISH COLUMBIA: Glacier National Park, Asulkan Glacier area [Aug.] (1; CUIC), Glacier [July-Aug.] (6; CAS, CNC, PURC), Rogers Pass ([1370m]) [Aug.] (2; ANSP, CAS); Kootenay National Park [Aug.] (3; CNC), Kimpton Creek ([1220m]) [July] (2; CNC), Kindersley Pass ([2130m]) [July] (4; CNC), Kootenay River (at Highway 1B) [Aug.] (1; UASM), Marble Canyon [July] (1; CNC), Sinclair Creek ([1830m] and at Highway 13) [June-Aug.] (25; CAS, CNC, UASM, UBC), Vermillion Creek [July] (4; CAS, MSU, UBC); Yoho National Park [July] (3; CAS), Amiskwi River (and at Amiskwi Falls [1830m]) [Aug.] (34; CNC), Field (and 3 mi. e. on Kicking Horse River) [June, Aug.] (4; CAS, USNM), Lake Oesa ([2130m]) [July] (18; CNC), Lake O'Hara [July] (10; CAS, CNC, UBC), Otterhead River ([1680m]) [Aug.-Sept.] (29; CNC, DHKa), Yoho River

([1400m], 4 to 12 mi. e. of Field, at Takakkaw Falls [1520m]) [July-Aug.] (25; CNC, DHKa, UASM); Other localities, Bosewell [Aug.] (1; UASM), Cabin Creek (ne. of Fernie, near Michel) [July] (13; CNC, UASM), Creston (8 mi. w.) [June] (3; CNC), Crowsnest Pass (2 mi. [1280m] and 5 mi. w. on Elk River [1220m]) [July] (51; DHKa), Edgewood [July-Aug.] (3; CAS), Elk Creek (e. of Fernie) [July] (4; UASM), Elk River (10.7 mi. w. of Fernie) [July] (3; ROM), Erickson (Arrow Creek) [Aug.] (12; CAS, UBC), Fernie (Coal Creek [1680m], Fairy Creek, Lizard Creek) [July-Aug.] (63; BFCa, CAS, CNC, DBUM, FMNH, MSU, UBC), Flathead [June] (1; CUIC), Fort Steele [June, Sept.] (2; CAS, UBC), Fortysixmile Camp (at Hope Trail) [July] (4; CAS, CNC, UBC), Hope Mountains [July-Sept.] (6; CNC, INHS, MCZ), Hosmer (Elk River) [July] (1; CAS), Lorna [June] (2; CAS, UBC), Manning Provincial Park (Nicomen Ridge) [July] (10; CAS, CNC, MSU, UBC), Michel (5; UASM), Mount Copeland ([1980m]) [Aug.] (21; CNC), Radium Hot Springs [Aug.] (6; CAS, CNC, UBC), Slocan [Aug.] (2; BFCa), South Fork Creek [Aug.] (1; UWBM), Summit Creek (near Creston) [Aug.] (5; UASM), Tetsa River (Alaska Highway mi. 378 and 390) [Aug.] (3; DHKa, MSU), Vernon [July] (1; CAS), Whipsaw Creek (at Hope Trail [1460m]) [July] (1; UBC), Wyndel [Sept.] (1; CNC). YUKON TERRITORY: Rancheria (Swift River) [Aug.] (6; CNC, UASM).

UNITED STATES OF AMERICA

IDAHO: Blaine Co., Alturas Lake (at Alturas Inlet Campground [2130m]) [Aug.] (11; DHKa), Cherry Creek (0.1 mi. nw. of Highway 93 [2230m]) [Aug.] (6; DHKa), Dollarhide Summit (2 mi. e. at North Fork Warm Springs Creek [2350m-2410m]) [Aug.] (9; DHKa), Galena [July] (1; BFCa), Galena Summit (2.4 mi. ne. [2320m]) [Aug.] (12; DHKa), Hyndman Creek [July] (22;

UWBM), Ketchum (2 mi. wnw. at Big Wood Creek [1830m]) [Aug.] (28; DHKa), North Fork Warm Springs Creek (10 mi. w. of Ketchum [1890m]) [Aug.] (92; DHKa), Sun Valley [Sept.] (2; JSch); Camas Co., Carrie Creek (32 mi. [2440m] and 36 mi. [2100m] ese. of Ketchum) [Aug.] (106; DHKa), South Fork Boise River (14 mi. e. of Featherville at Skeleton Creek [1550m], 34 mi. e. of Featherville at Bear Creek [1830m]) [Aug.] (157; DHKa); Cassia Co., Rock Creek (15 mi. s. of Hansen, at Rock Creek Ranger Station) [June-July] (6; UIMI); Custer Co., Bayhorse Creek (7 mi. nw. of Highway 93 [2440m]) [Aug.] (3; DHKa), Fourth of July Creek (3 mi. e. of Highway 93 [2230m]) [Aug.] (58; DHKa), Stanley [July] (1; UWBM), Trail Creek Summit (2 mi. ne. at Summit Creek [2320m]) [Aug.] (9; DHKa); Fremont Co., Island Park [July] (3; BFCa); Shoshone Co., Avery (7 mi. e.) [July] (1; UIMI); Valley Co., Dagger Falls [July] (2; BFCa), Middle Fork Salmon River (near Boundary Creek) [Aug.] (7; RTBe); County unknown, Twin Creek Forest Camp ([1520m]) [July] (57; UWBM). MONTANA: Carbon Co., Quad Creek (17 mi. sw. of Red Lodge [3050m]) [July] (66; DHKa); Fergus Co., East Fork Rock Creek ([1710m]) [July] (42; DHKa); Flathead Co., Marias Pass (10 mi. w. of Summit [1370m]) [July] (11; LRus), South Fork Flathead River at Hungry Horse Reservoir [1220m] [July] (3; LRus); Gallatin Co., Fairy Lakes [Aug.] (1; CUIC); Glacier National Park [July-Aug.] (6; CUIC), Baring Creek (at St. Mary Lake) [Aug.] (3; UWBM), Grinnell Falls ([1860m]) [Aug.] (1; SJSC), Grinnell Glacier ([1860m-1890m]) [Aug.] (21; DHKa, SJSC, USNM), Grinnell Lake (at inlet [1540m]) [Aug.] (1; DHKa), Lake McDonald (and at Sprague Creek Campground) [July-Aug.] (4; CAS, RTBe), Lake Sherburne (at Canyon Creek) [July] (1; CAS), Logan Pass ([2030m-2130m] and 5 mi. w. [1770m]) [July-

Sept.] (16; DHKa, JSch, RTBe, UASM), Morning Eagle Falls ([1680m]) [July] (1; SJSC), Mount Clements (northeast slope [2160m]) [July] (5; DHKa), Piegan Pass ([2410m]) [Aug.] (1; SJSC), St. Mary [Aug.] (8; SJSC, UASM); Madison Co., Beaver Creek ([1920m]) [Aug.] (1; KUSM), Ennis [July] (2; UIMI); Mineral Co., Haugan [Aug.] (14; KUSM), Lookout Pass ([1280m]) [July] (1; LRus), Saltese [July, Sept.] (3; MSU, SJSC); Sweetgrass Co., Big Timber Creek (at Half Moon Campground [2230m-2290m]) [July] (1; DHKa). NEVADA: Elko Co., Lamoille Creek (at Lower Lamoille Campground [1920m]) [Aug.] (35; DHKa), Thomas Creek (at Thomas Creek Campground [2320m-2380m]) [Aug.] (130; DHKa). OREGON: Baker Co., Cornucopia [June-July] (35; BFCa, UWBM); Union Co., Elgin (and 9 mi. nw. at Little Phillips Creek [1300m]) [May, Aug.] (6; DHKa), Langdon Lake area (se. of summit) [Aug.] (2; UWBM), Tollgate-Elgin Road [June] (3; UWBM); Wallowa Co. [Aug.] (1; JSch), Aneroid Lake ([2320m]) [July] (2; FMNH), East Fork Eagle Creek [July] (9; UWBM), Indian Crossing (Imnaha River) [Aug.] (2; MSU, OSUO), Lostine River ([1310m], at French Campground, at Two Pan Campground [1710m-1980m]) [Aug.] (112; DHKa, USNM, UWBM), Lost Lake [Aug.] (1; UWBM), Wallowa Lake [July-Aug.] (10; DHKa, UWBM), Wallowa River (above inlet to Wallowa Lake) [May] (1; DHKa). WASHINGTON: Walla Walla Co., Walla Walla [Aug.] (1; UWBM). WYOMING: Big Horn Co., Granite Pass (8 mi. sw. on Granite Creek [2380m]) [July] (5; DHKa), Shell Creek (11 mi. sw. of Granite Pass [2130m]) [July] (14; DHKa), West Tensleep Creek ([3140m-3200m]) [July] (17; DHKa); Johnson Co., Clear Creek (12 mi. w. of Buffalo [2190m]) [July] (1; DHKa), South Fork Clear Creek (16 mi. w. of Buffalo [2350m], at South Fork Campground [2350m]) [July-Aug.] (6; DHKa, FMNH); Sheridan Co., Little Tongue River

(13 mi. wsw of Dayton [2380m]) [July] (22; DHKa); Washakie Co., Tensleep (6 mi. [1550m] and 11 mi. [1890m] ne. on Tensleep Creek) [July] (4; DHKa); Yellowstone National Park [Aug.] (25; USNM); County unknown, Bighorn Reserve (1; MCZ).

Nebria arkansana oowah Kavanaugh, NEW SUBSPECIES

Specimens examined: 77 (55♂, 22♀)

UNITED STATES OF AMERICA

UTAH: Grand Co., Mill Creek (at Oowah Lake [2680m]) [Aug.] (74; DHKa); San Juan Co., Mill Creek Valley ([2900m]) [Aug.] (3; UASM).

Nebria arkansana uinta Kavanaugh, NEW SUBSPECIES

Specimens examined: 94 (45♂, 49♀)

UNITED STATES OF AMERICA

UTAH: Cache Co., Logan River (13.7 mi. e. of Logan at Cottonwood Creek [1740m]) [Aug.] (65; DHKa); Summit Co., Lost Lake ([2990m]) [Aug.] (7; DHKa), Upper Provo River (20.8 mi. e. of Kamas [2660m], at Highway 150) [Aug.] (6; DHKa, USNM); Uintah Co., Big Brush Creek (7 mi. wnw. of Highway 44 [2620m]) [Aug.] (14; DHKa); Weber Co., Ogden (6 mi. e. on Ogden River [1490m]) [Aug.] (2; DHKa).

Nebria brevicollis Fabricius

Map: Figure 380

Specimens examined: 2 (2♂)

CANADA

QUEBEC: Cte de Rouville, St-Cesaire [June] (1; DBUM).

SAINT PIERRE AND MIQUELON

MIQUELON: Langlade (1; MHNP).

Nebria carri Kavanaugh, NEW SPECIES

Map: Figure 405

Specimens examined: 153 (63♂, 90♀)

UNITED STATES OF AMERICA

IDAHO: Adams Co., Towsley Springs (9 mi. nne. of Cuprum [2070m]) [July-Aug.] (4; BFCa, DHKa); Blaine Co., Dollarhide Summit (1.0 to 2.0 mi. e. on North Fork Warm Springs Creek [2350m-2500m]) [Aug.] (138; DHKa), Twin Lakes Trail (w. of Petit Lake) [July] (2; BFCa); Camas Co., Carrie Creek (32 mi. wsw. of Ketchum [2440m]) [Aug.] (9; DHKa).

Nebria charlottae Lindroth

Map: Figure 393

Specimens examined: 1 (1♂)

CANADA

BRITISH COLUMBIA: Queen Charlotte Islands (1; CNC).

Nebria coloradensis Van Dyke

Map: Figure 410

Specimens examined: 55 (35♂, 20♀)

UNITED STATES OF AMERICA

COLORADO: Delta Co., Grand Mesa [July] (2; CUB); Eagle Co., Redcliff

[Aug.] (2; MSU, USNM); Garfield Co., Picket Pin Creek (21 mi. ne. of Buford [2870m]) [Aug.] (14; DHKa); Gunnison Co., Mexican Cut Lake (1 mi. nw. of Elko Park [3440m]) [Aug.] (2; PMNH), Rustlers Gulch Trail ([3200m]) [July] (1; SJSC); Lake Co., Lake Creek (7 mi. and 12 mi. w. of Twin Lakes) [Aug.] (5; DHKa, EAMa), Leadville ([3050m-3350m]) [July] (3; DHKa, MCZ, USNM), Twin Lakes [June] (1; CAS); Mesa Co., (1; USNM); Park Co., Middle Fork South Platte River (near Hoosier Pass [3510m]) [July] (9; DHKa), Mount Bross (near Alma [3510m]) [July] (1; CAS), Tarryall Creek (8 mi. w. of Como) [July] (2; EAMa); Summit Co., Monte Cristo Creek ([3350m]) [July] (1; DHKa), Quandary Peak (east slope [3350m-3960m]) [July-Aug.] (11; DHKa, USNM).

Nebria crassicornis Van Dyke

Map: Figure 387

Nebria crassicornis crassicornis Van Dyke

Specimens examined: 1907 (878♂, 1029♀)

CANADA

BRITISH COLUMBIA: (2; AMNH, INHS); Copper Mountain [May] (1; UBC), Fraser River Valley (2; ANSP, CAS), Hope Pass (summit [1830m]) [July] (12; UBC), Manning Provincial Park ([1370m] and Blackwall Peak [1830m-2060m], Nicomin Ridge) [June-Sept.] (101; CAS, CNC, DHKa, KSUC, KUSM, MCZ, UASM, UBC, UMMZ), Welch Peak [=Mount Wahleach] ([1520m-1680m]) [July] (3; INHS, UBC).

UNITED STATES OF AMERICA

WASHINGTON: Chelan Co. ([1830m]) [July] (12; CAS); Clallam Co.,

Indian Creek (s. of Lake Sutherland) [Aug.] (2; CAS); Mount Rainier National Park ([1520m-2130m]) [July-Aug.] (170; ALar, AMNH, CAS, CUIC, DHKa, ICCM, JSch, KSUC, LACM, MCZ, MSU, NMDo, OSUC, OSUO, UASM, UBC, UCR, USNM, UWBM, WSU), Berkeley Park [Aug.] (1; MCZ), Chinook Pass ([1680m]) [July-Aug.] (20; CAS, LRus, USNM), Fryingpan Creek ([1190m]) [July] (1; DHKa), McClure Rock ([2130m]) [Aug.] (2; CAS, DHKa), Narada Falls ([1370m]) [July] (1; UWBM), Nisqually River ([1160m-1420m]) [July] (5; DHKa, UWBM), Paradise area (Edith Creek Basin [1710m-1920m], Golden Gate [1920m-1980m], Paradise Park [1520m-2130m], Paradise River [1460m-1830m], Paradise Valley [1520m-2440m]) [July-Aug.] (401; CAS, CNC, CUIC, DHKa, FMNH, ICCM, KSUC, LRus, MCZ, MSU, NMDo, OSUO, UASM, UBC, UCB, UCD, UMRM, USNM, UWBM), Reflection Lake [July-Aug.] (6; CAS, FMNH, UWBM), Snow Lake ([1520m]) [Aug.] (1; CNC), Spray Park ([1980m]) [Aug.] (2; LRus), Sluskin Falls [July] (8; UWBM), Sunrise area (east slope Burroughs Mountain [1890m-2190m], Shadow Lake [1860m], Sunrise Park [2040m]) [July-Sept.] (599; CAS, CNC, DHKa, LRus, SJSC, UIMI, USNM, UWBM), Tipsoo Lake ([1620m-1650m]) [July-Sept.] (71; AMNH, ANSP, CAS, CUIC, GRNo, ICCM, KSUC, MCZ, PURC, UASM, UIMI, UMMZ, USNM, UWBM), Van Trump Park ([1830m]) [Aug.] (20; CNC), Yakima Park ([1950m-2290m]) [July-Aug.] (40; FMNH, MCZ, RTBe, UIMI, UWBM); Olympic National Park [July-Aug.] (14; CAS, CUIC, ICCM, MCZ), Boulder Peak ([1520m]) [Aug.] (1; CNC), Eagle Point ([1830m]) [July] (31; CNC), Hurricane Ridge ([1220m]) [July-Aug.] (4; LRus, UWBM), Obstruction Peak ([1830m-1970m]) [July-Aug.] (201; CAS, CNC, DHKa), Soleduck High Divide ([1520m]) [Aug.] (5; LRus); Pierce Co., Ashford (1; USNM), Summit Lake [Aug.] (1; EMUS); Whatcom Co., Glacier [July] (1; USNM), Harts Pass ([1890m]) [July] (20; USNM), Mount Baker (Austin Pass [1190m-1310m], Chain Lakes, The Dome,

Heather Meadows [1200m], Kulshan Ridge [1430m]) [July-Aug.] (135; CAS, DHKa, UWEM, WSU), Shuksan [Aug.] (1; OSUO); Yakima Co., American River [July-Aug.] (7; UIMI, USNM); County unknown, Miners Ridge [July] (1; UWEM).

Doubtful Records. CANADA, ALBERTA: Banff National Park, Lake Louise [Aug.] (18; KUSM). MANITOBA: Cedar Lake [July] (1; MCZ). UNITED STATES OF AMERICA, ARIZONA: Cochise Co., Portal (5 mi. w. [1650m]) [Sept.] (1; CAS).

Nebria crassicornis intermedia Van Dyke

Specimens examined: 2222 (1070♂, 1152♀)

CANADA

ALBERTA: [July] (2; BFCa); Banff National Park [July] (2; UWEM), Banff [May-Aug.] (63; CAS, CUIC, BFCa, PMNH, UBC, USNM), Boom Lake ([1830m]) [July] (1; CNC), Bow Lake [Aug.] (11; UASM), Bow Pass ([2070m-2130m]) [July-Sept.] (26; CNC, RTBe, UWEM), Bow River ([1830m] and 2 mi. w. of Lake Louise) [May, Aug.-Sept.] (4; CNC, DRWh, RTBe), Cascade Creek (near Banff) [Sept.] (1; DJLa), Consolation Lake ([1950m-2130m]) [June] (7; CNC), Eisenhower Junction (12 mi. w.) [June] (3; CNC), Glacier Lake ([2130m]) [July] (2; ANSP), Johnston Creek (2.5 mi. above Johnston Canyon Campground) [July] (1; ROM), Lake Agnes [June-Aug.] (29; CUIC, PMNH, USNM), Lake Helen ([2380m]) [Aug.] (3; CNC), Lake Louise ([2040m] and 2 mi. w. [1630m]) [June-Aug.] (72; AMNH, CAS, CNC, CUIC, KUSM, MCZ, UASM, UBC, USNM), Moraine Lake (and Larch Valley [2290m]) [June-Aug.] (42; CAS, CNC, CUIC, PMNH), Mount Fairview ([2440m-2740m]) [July] (2; CAS), Mount St. Piran [Aug.] (1; ANSP), Ptarmigan Lake

([2290m]) [Aug.] (4; CNC), Ptarmigan Pass ([2130m-2440m]) [July] (11; CAS), Ptarmigan Peak ([2590m]) [Aug.] (4; CNC, UASM), Redoubt Lake ([2380m]) [Aug.] (1; CNC), Simpson Pass [July] (2; ROM), Sulphur Mountain ([1520m-2130m]) [Aug.] (9; UASM), Sunshine Ski Area [Sept.] (1; DRWh), Waterfowl Lake [Aug.] (2; SJSC), Wenkchemna Peak [June] (8; PMNH); Jasper National Park [Aug.] (2; AMNH), Alpine Meadows ([1980m-2290m]) [Aug.] (10; UASM), Amethyst Lake ([1970m-2030m]) [July-Aug.] (61; DHKa, DJLa, GRNo, SJSC, USNM), Angel Glacier ([1710m]) [July-Aug.] (7; DHKa, RTBe), Bald Hills ([2130m-2260m]) [June-Aug.] (15; DHKa), Columbia Icefield Campground [July, Sept.] (34; CUIC, USNM), Geraldine Lakes [July] (5; USNM), Jasper area ([2130m]) [Aug.] (4; CNC, MCZ), Jonas Campground [Aug.] (1; UASM), Maligne Lake ([1680m and Shovel Pass) [July] (5; CAS, CUIC, MCZ), Miette Hot Springs [July-Aug.] (2; MCZ, UASM), Mount Edith Cavell ([1370m-1830m] and Alley Brook) [June-July, Sept.-Oct.] (34; DHKa, ROM, UAFA, USNM), Portal Creek Trail (mi. 4 [1950m]) [July] (1; DJLa), Signal Mountain [Sept.] (1; RTBe), Tangle Creek [June] (1; USNM), Whirlpool River [June] (7; DHKa); Waterton Lakes National Park, Bertha Lakes ([1620m]) [July] (1; SJSC), Cameron Lake area ([1660m-1980m]) [July] (12; UASM), Rowe Brook ([1830m]) [July] (1; SJSC), Twin Lakes ([1950m]) [July] (6; DJLa), Upper Rowe Lake [July] (4; SJSC), Waterton Park [July] (6; CNC, MCZ); Other localities, Barnaby Lakes ([2040m]) [Aug.] (3; DJLa), Cadomin [June] (1; UASM), Cardinal River [May] (1; DHKa), End Mountain [July] (1; UASM), Entrance (40 mi. wnw. at North Fork Wildhay River [1430m]) [July] (1; DHKa), Highwood Pass ([2320m-2410m]) [June, Aug.] (2; CNC), Highwood River [July] (2; BFCa), Jumpingpound Creek (20 mi. sw. of Highway 1) [June] (6; DHKa), Kananaskis Forest Experiment Station area

[June] (1; CNC), Kananaskis Lakes [Aug.] (1; BFCa), Loaf Mountain ([2290m]) [July] (3; DJLa), Marmot Creek Basin ([1980m]) [July] (13; CNC), Mercoal [Aug.] (1; UASM), Nordegg (South Creek Bridge, 20 mi. s. on Forestry Trunk Road) [July] (10; DHKa, UASM), North Saskatchewan River (near Nordegg) [July] (5; RFre, UASM), Oyster Creek Pass [Aug.] (7; CAS, UBC), Pembina River (20 mi. se. of Robb [1300m]) [Sept.] (1; UASM), Pinto Lake [July] (2; CAS), Pocatererra Creek [Aug.] (3; BFCa), Prospect Mountain (at Prospect Creek [1670m]) [Sept.] (2; UAFA), Sheep River (4.5 mi. above Gorge Creek) [Aug.] (1; DHKa), Snow Ridge (20 mi. sw. of Kananaskis Forest Experiment Station [2130m]) [July] (1; CNC), Ware Creek (5 mi. nw. of R. B. Miller Research Station) [Aug.] (2; DHKa); Location unknown, Boulder Pass [Aug.] (4; UASM). BRITISH COLUMBIA: (5; ALar, ANSP, LEMC, MCZ); Glacier National Park, Mount Abbott Trail ([2350m]) [Aug.] (1; SJSC), Rogers Pass ([1370m]) [June, Aug.] (4; ANSP, CAS, CUIC, RFre); Kootenay National Park, Kindersley Pass ([2130m]) [July] (12; CNC), Sinclair Creek ([1830m]) [June] (20; CNC), Vermillion Creek [July] (1; UBC), Vermillion Pass [June] (9; BFCa); Mount Revelstoke National Park ([1980m]) [Aug.] (4; CNC), Eva Lake ([1980m] and Eva Lake Trail [1770m]) [July] (19; CNC), Millar Lake ([1920m]) [Aug.] (4; CNC), Mount Revelstoke ([1650m-1980m]) [June-Aug.] (133; CAS, CNC, KUSM, MCZ, MSU, ROM, UASM, UBC, UWBM); Yoho National Park [June-July] (5; BFCa, CAS, USNM), Amiskwi River ([1830m] and at Amiskwi Falls [1830m]) [Aug.] (5; CNC), Emerald Lake [Aug.] (6; CUIC, MCZ), Field [July-Aug.] (7; ANSP, USNM), Kicking Horse Camp-ground [July] (2; UBC), Lake McArthur ([2130m]) [July] (21; CNC), Lake Oesa ([2130m]) [July] (3; CNC), Lake O'Hara ([2040m]) [July-Aug.] (10; CAS, CNC, CUIC, UBC), Linda Lake ([2040m]) [July] (1; CNC), Mount

Burgess [Sept.] (7; ALar, RTBe), Takakkaw Falls ([1490m]) [Oct.] (2; UASM), Yoho River ([1520m] and 4 to 12 mi. ne. of Field) [Aug.] (6; MCZ, UASM); Other localities, Barkerville (and Grouse Creek [1280m], Round Top Mountain [1830m-1890m]) [Aug.-Sept.] (75; CAS, CNC, CUIC, UASM, UBC, UWM), Beavermouth [Aug.] (2; ANSP), Cariboo Heart Range ([1370m]) [Sept.] (1; UBC), Donald (8; CUIC, ICCM, ISUI, SDSU, UMMZ, USNM), Dunn Peak ([2130m]) [Aug.] (1; CNC), Gold River [Aug.] (2; ANSP), Grave Creek (15 mi. n. of Michel [1800m]) [Aug.] (1; UBC), Hunters Range [Sept.] (1; CAS), Invermere [Aug.] (1; CAS), Liard Hot Springs (Alaska Highway mi. 496 [460m]) [Aug.] (1; CNC), Lightning Peak ([1830m]) [Sept.] (2; UBC), Lisadele Lake ([1220m]) [July] (3; ALar, CNC), Lorna (and Little White Mountain) [June-Aug.] (26; CAS, INHS, KSUC, MCZ, MSU, UBC, UIMI), Manson River [Aug.] (1; UBC), Morrissey (Bighorn Creek [1529m]) [Aug.] (1; UBC), Mount Copeland ([1980m]) [Aug.] (5; CNC), Mount Murray ([2070m]) [Aug.] (1; CAS), Mount Robson Provincial Park (Jade Lake Trail [2230m], Mount Robson [1830m]) [July] (29; ANSP, CAS, CNC, MCZ, OSUC, UBC, USNM), Mount Thompson (near Canoe River [2440m]) [Aug.] (5; CNC), Okanagan Landing [June] (2; UBC), Osoyoos area (1; MCZ), Pine Pass (Hart Highway [930m]) [June] (2; UASM), Prairie Hills [July] (5; ANSP, CAS, CUIC), Quesnel Lake [May] (1; CAS), Raft Mountain ([2590m]) [June] (3; UBC, UWM), Rawlings Lake (near Lumby) [Sept.] (1; UBC), Skookumchuk area [Aug.] (1; ROM), Smoky Creek (at headwaters) [Aug.] (2; USNM), Stanley [July-Aug.] (5; UBC), Summit Lake (Alaska Highway mi. 392 [1280m-1620m]) [June-July] (12; CNC, UASM), Tetsa River (Alaska Highway mi. 383) [June] (3; CNC, UASM), Terrace (9; CAS, DHKa, UBC), Thornhill Mountain (near Terrace [1520m]) (6; MCZ), Two Sisters

Mountain (15 mi. e. of Barkerville [1680m-1980m]) [June] (5; CNC); Location unknown, Bowman Lake [Sept.] (1; UWBM), Paradise Mine [Aug.] (4; CAS, UWBM), Park Mountain [June] (3; CAS, UBC), Waterloo Mine [Aug.] (3; INHS, MSU).

UNITED STATES OF AMERICA

IDAHO: Adams Co., New Meadows area [June] (1; UIMI); County unknown, "southeastern Idaho" [July] (1; UWBM). MONTANA: Carbon Co., Rosebud Lake [June] (1; DHKa); Glacier National Park [July-Aug.] (23; CUIC, UCR, USNM), Boulder Pass ([2410m]) [July] (1; SJSC), Chaney Glacier ([2290m]) [Aug.] (1; USNM), Fallen Leaf Lake (Allen Mountain [2040m]) [July] (1; SJSC), Grinnell Glacier ([1920m]) [Aug.] (1; SJSC), Grinnell Lake ([1540m]) [July] (1; SJSC), Gunsight Pass ([1980m]) [July] (1; SJSC), Hidden Lake ([1950m]) [July] (2; GRNo, SJSC), Hidden Pass ([2160m]) [Aug.] (3; SJSC), Iceberg Lake ([1840m]) [July] (1; USNM), Lake McDonald [July] (4; CAS), Logan Pass ([1840m-2100m]) [June-Sept.] (175; CAS, CUIC, DHKa, LRus, MCZ, NMDo, RTBe, SJSC, UASM, UCB), Many Glacier ([1370m]) [July] (2; LRus), Mount Clements (northeast slope [2160m]) [July] (28; DHKa), Piegan Pass ([2420m]) [July] (2; SJSC), Reynolds Mountain (west slope) [Aug.] (2; SJSC), Shangri-La Lake (north of Mount Wilbur [2040m]) [June] (1; SJSC), Sperry Chalets ([2010m]) [July] (2; SJSC, USNM), Sperry Glacier ([2590m]) [Aug.] (1; RTBe), Swiftcurrent Lake ([1480m] and at Canyon Creek) [July] (2; CAS, SJSC); Granite Co., Stony Lake [July] (1; DZEC); Park Co., Cooke City [Aug.] (1; SJSC). OREGON: Baker Co., Anthony Lake ([2130m-2150m]) [June-Aug.] (89; DHKa, FMNH, OSUO, UASM, UWBM), Antone Creek ([2100m]) [May] (1; DHKa); Grant Co., Strawberry Lake ([2620m]) [Sept.] (1; OSUO);

Wallowa Co. [Aug.] (2; JSch), Aneroid Lake ([2290m-2320m]) [July] (83; CAS, FMNH, INHS, UWBM), Dollar Lake ([2500m-2620m]) [July] (20; FMNH, UWBM), Eagle Cap ([2930m]) [Aug.] (1; PUCA), Ice Lake [July] (4; ODA), Lostine River (above Two Pan Campground [1710m-2000m]) [Aug.] (94; DHKa), Wallowa Lake [July] (10; UWBM). UTAH: Cache Co., Logan area [Sept.] (1; EMUS); Duchesne Co., Butterfly Lake ([2900m-3050m]) [June, Aug.] (23; DHKa, MCZ), Granddaddy Lake (2; UMMZ), Mirror Lake (1; UMMZ); Sanpete Co., Ephraim Canyon (Ephraim Creek [2900m]) [Aug.] (1; USNM); Salt Lake Co., Alta [June-July] (32; ANSP, ICCM, USNM), Lambs Canyon ([3000m]) (4; MHNH), Silver Lake [July] (6; ANSP, CUIC); Sevier Co., Monroe Peak (8.6 mi. [2620m] and 12.4 mi. [2990m] se. of Monroe) [July] (35; DHKa); Summit Co., Lost Lake ([2990m]) [Aug.] (15; CAS, DHKa), Tryol Lake (5; UMMZ); Uintah Co., (15; USNM); Utah Co., Aspen Grove ([2070m]) (1; PURC); Weber Co., Uintah [Aug.] (1; EMUS); County unknown, Wasatch ([2440m]) [July] (2; OSUC), Wasatch National Forest [Aug.] (2; BFCa). WASHINGTON: Okanogan Co., Mount Bonaparte ([2130m] and Top Cache [2190m]) [July-Aug.] (70; ANSP, CAS, MCZ, UIMI, USNM, UWBM, WSU); Walla Walla Co., Walla Walla area [July] (14; CUIC). WYOMING: (2; MCZ); Fremont Co., Union Pass [Aug.] (1; USNM), Wind River Rest Area ([2740m]) [June] (2; USNM); Grand Teton National Park [July] (8; CAS), Alaska Basin (Sunset Lake [2940m]) [July] (2; SJSC), Lake of Crags ([2900m]) [July] (1; SJSC), Mica Lake ([2970m]) [July] (15; DHKa, SJSC, USNM), Petersen Glacier ([2990m]) [July] (3; DHKa, SJSC, USNM), South Fork Cascade Canyon ([3020m-3110m]) (4; SJSC, USNM), Spalding Falls ([3230m]) [Aug.] (1; SJSC), Timberline Lake [July] (9; SJSC, USNM), Upper Cascade Canyon ([3050m]) [July] (1; SJSC); Park Co., Beartooth Plateau [Aug.] (1; SJSC); Sublette Co., Fremont Lake [July] (40; CAS), Green River

Lakes (west shores [2440m-2590m]) [July] (3; DHKa); Teton Co., Blackrock Creek (3.7 mi. wnw. of Togwotee Pass [2770m]) [Aug.] (1; DHKa), Jackson area [June] (1; UWLW), Sheep Mountain ([2900m]) [Aug.] (1; ANSP), Teton Pass area ([2650m]) [June] (1; SJSC); Togwotee Pass ([2960m]) [July-Aug.] (137; DHKa, KUSM, SJSC); Yellowstone National Park ([2130m-3050m]) [June, Sept.] (14; CAS, ICCM, MCZ, UCR, USNM), Hellroaring Divide [July] (2; DZEC), Mount Washburn [Aug.] (13; MCZ, USNM), Norris Junction [June] (1; CAS), Stinking Water Creek [Sept.] (7; ICCM, MCZ), Sylvan Pass [June] (1; USNM).

Doubtful Records. CANADA, ALBERTA: Edmonton [July] (15; UASM).

UNITED STATES OF AMERICA, CALIFORNIA: (1; ICCM). OREGON: Jackson Co., Little Applegate River ([700m]) [Aug.] (5; FMNH, UWBM).

No Data. (4; ANSP, MCZ, ROM).

Nebria darlingtoni Kavanaugh, NEW SPECIES

Map: Figure 399

Specimens examined: 172 (106♂, 66♀)

UNITED STATES OF AMERICA

CALIFORNIA: El Dorado Co., [Aug.] (9; CAS, ICCM, KSUC, MCZ, USNM), Kyburz (2 mi. e. on South Fork American River [1340m]) [July] (5; CAS, DHKa), Pacific House [Sept.] (5; CAS), Riverton (South Fork American River [980m], 3 mi. w. at Bridal Falls Picnic Area [910m]) [July-Aug.] (151; AMNH, CAS, DHKa, KUSM), White Hall [June] (2; UASM).

Nebria desolata Kavanaugh

Map: Figure 400

Specimens examined: 258 (125♂, 133♀)

UNITED STATES OF AMERICA

UTAH: Garfield Co., Boulder (11 mi. se. at The Gulch [1710m-1830m]) [June-July] (207; CAS, DHKa, MCZ, MHNp, SJSC, UASM, USNM), Dry Creek (23.1 mi. sw. of Escalante [2130m]) [June] (29; DHKa), Escalante River (15 mi. e. of Escalante [1710m]) [June] (15; DHKa); Kane Co., Garfield (East Fork Virgin River) (4; MHNp), Orderville (East Fork Virgin River) [Apr.] (3; USNM).

Nebria diversa LeConte

Map: Figure 401

Specimens examined: 1797 (946♂, 851♀)

CANADA

BRITISH COLUMBIA: Vancouver area [June] (1; UAFA); Queen Charlotte Islands, Graham Island (Masset, North Beach, Rose Point, Tllel, 10 mi. s. and 25 mi. n. of Tllel, Tow Hill and on Tow Hill Road) [May-Aug.] (243; CNC, CUIc, DHKa, FMNH, ICCM, MCZ, UASM, UBC, UMMZ, UWBM); Vancouver Island, Tofino (and 6 mi. s. at Chesterman Beach, 12 mi. s. at Long Beach) [May-June, Aug.-Oct.] (119; ALar, CNC, DBUM, DHKa, UBC, UWBM), Victoria (and Albert Head) [Aug.] (6; CNC, UASM); Location unknown, Puget Sound (1; AMNH).

UNITED STATES OF AMERICA

CALIFORNIA: Del Norte Co., (1; FMNH), Crescent City [May, July] (5; CAS). OREGON: (34; ANSP, ICCM, INHS, KSUC, KUSM, MCZ, USNM, WSU); Clatsop Co., (2; OSUO), Astoria [July] (5; OSUC), Cannon Beach [June-Aug.] (14; JSch, MCZ, UASM, UWEM), Fort Stevens (at Fort Stevens State Park, at South Jetty) [Aug.-Sept.] (9; OSUO, UIMI, UWEM), Gearhart [Apr., June] (22; ALar, LRus, UCR, USNM, UWEM), Seaside [July, Sept.] (23; CAS, CUIC, FMNH, MCZ, UIMI, UWEM, WSU), Warrenton (1; UWEM); Coos Co., Bandon (and 2 mi. n.) [July, Sept.] (11; BFCa, CAS), Cape Arago [May] (1; FMNH), Charleston (and 1 mi. w.) [May-Sept.] (23; CNC, DHKa, FMNH, JSch, NMDo, OSUO, UIMI, UWEM), Coos Bay [May] (1; UWEM), Coos Head [May, Aug.] (9; CAS, FMNH), Hauser [May, Oct.] (21; MCZ, OSUO, UCD, USNM, UWEM), Seven Devils Beach [Aug.] (1; LRus), Sunset Beach [June] (5; JSch, NMDo); Curry Co., Gold Beach [Apr., June-July] (19; CAS, OSUO, USNM, UWEM), Hubbard Creek (near Port Orford) [Dec.] (1; USNM), Humbug Mountain State Park [May-June] (9; CAS, FMNH, ODA, OSUO, UCD, UWEM), Pistol River [July, Sept.] (23; CAS, FMNH, INHS, UWEM); Douglas Co., Carter Lake Campground (10 mi. s. of Dunes City) [June] (1; ROM), Gardiner [June] (2; CAS), Tahkenitch Lake [June] (2; UWEM), Winchester Bay [May] (4; FMNH, UWEM); Lane Co., Carl G. Washburne Memorial State Park [June] (3; USNM), Florence (and at Munsel Lake) [May-June, Sept.] (13; FMNH, JSch, OSUO, UMMZ, UWEM), Glenada [June-Sept.] (22; CAS, FMNH, INHS), Heceta Beach [July] (1; BFCa), Siltcoos area (Siltcoos Camp, Siltcoos Outlet) [Mar., June, Sept., Nov.] (20; FMNH, LRus, PUCA, UWEM); Lincoln Co., [June] (7; FMNH), Boiler Bay [Apr.-May] (6; CAS, OSUO), Burntwood Beach [Aug.] (2; OSUO), Delake [June] (1; JSch), Depoe Bay [Apr.] (1; UWEM), Devils Lake [Apr., June] (2; UWEM), Fogarty Creek State Park [Oct.]

(1; OSUO), Governor Patterson Memorial State Park [July] (5; BFCa), Lincoln Beach [Mar.] (1; UWBM), Newport [Apr.-Aug., Dec.] (74; AMNH, ANSP, CAS, DBUM, DEUC, FMNH, KSUC, LACM, MCZ, OSUO, UMRM, USNM, UWBM, UWEM), Ocean Lake [May] (1; UWBM), Taft [July] (3; UIMI, UWBM), Waldport (and 2.5 mi. n.) [Mar.-July] (197; CAS, DHKa, FMNH, ICCM, MCZ, OSUO, UASM, UMMZ, USNM), Yachats [Aug.] (5; JSch, NMDo), Yaquina Bay [Sept.] (2; CAS); Tillamook Co., Barview Jetty [Aug.] (1; LRus), Cape Lookout State Park [Sept.] (1; OSUO), Island Camp (2 mi. s. of Sand Lake) [July, Sept.] (31; ODA, OSUO), Netarts [Aug.] (2; USNM), Pacific City [Feb., May, July-Aug.] (14; CAS, DHKa, FMNH, NMDo, UCR, UWBM), Rockaway [Sept.] (1; UWBM), Sand Lake [June-July] (65; CDA, MSU), Tierra Del Mar [Sept.] (3; DHKa), Tillamook [Aug.] (1; UWBM).

WASHINGTON: Clallam Co., Cape Flattery (2; MCZ), Mora area [May, Sept.] (7; UWBM), Mukkaw Bay [May] (3; UWBM), Neah Bay (and 1.8 mi. nw.) [May, Aug., Oct.] (22; FMNH, UWBM), Sequim Bay [May] (1; LRus); Grays Harbor Co., Copalis Beach [May, Aug.] (6; LRus, UWBM), Moclips [Apr., June, Sept.] (8; ANSP, CAS, UWBM), Ocean City State Park [May] (1; UWBM), Ocean Shores [May, Aug.] (399; DHKa, UWBM), Pacific Beach [Sept.] (1; UWBM), Twin Harbors State Park [July] (2; UWBM), Westport [Apr.-May, July-Aug.] (7; NMDo, OSUO, UWBM); Island Co., Whidbey Island (Coupeville, Deception Pass) [Apr.-May, July] (4; CAS, UWBM, WSU); Jefferson Co., Port Townsend (and at Fort Worden) [June] (52; MCZ, PADA, UWBM, WSU); King Co., Seattle (and at West Point) [July] (10; FMNH, UWBM); Pacific Co., Bay Center [July] (1; UWBM), Chinook [Sept.] (1; UWBM), Fort Canby State Park [Aug.] (1; UWBM), Ilwaco (and at North Jetty Beach) [May, July-Aug.] (36; LRus, MCZ, USNM, UWBM, WSU), Leadbetter Point [Aug.] (1; UWBM), Long Beach [May-Aug.]

(60; CAS, DHKa, GRNo, UWBM), Long Island (Willapa Bay) [Aug.] (1; UWBM), Nahcotta [May, July-Aug.] (3; UWBM), Naselle (8 mi. s.) [May] (1; ODA), Ocean Park [Aug.-Sept.] (10; UWBM, WSU), Oysterville [Aug.] (1; UWBM), Seaview [July-Aug.] (5; USNM, UWBM), Tokeland [June] (6; USNM, UWBM); San Juan Co., San Juan Island (Friday Harbor) [July] (1; UWBM); Thurston Co., Tumwater area (Black Lake) [May] (3; UWBM); County unknown, Stackpole Harbor [Aug.] (1; UWBM).

Doubtful Records. UNITED STATES OF AMERICA, CALIFORNIA: Sierra Co., [June] (5; FMNH). NEBRASKA: (1; AMNH). OREGON: Baker Co., Pine Creek [June] (1; MCZ); Klamath Co., Lake of the Woods [July] (8; DHKa, USNM); Marion Co., Pratum [Aug.] (1; OSUO); Multnomah Co., Portland (6; UAFA, USNM); Yamhill Co., (1; CAS). WASHINGTON: Pierce Co., Puyallup [Mar.] (2; ODA, PURC).
No Data. (8; MCZ, OSUO, USNM).

Nebria eschscholtzii Ménétriés

Map: Figure 400

Specimens examined: 6169 (2940♂, 3229♀)

UNITED STATES OF AMERICA

CALIFORNIA: [Feb.] (65; AMNH, ANSP, DBUM, DEUN, FMNH, ICCM, INHS, MCZ, UASM, UMMZ, UMRM, USNM, WSU); Alameda Co., (3; CAS, USNM), Arroyo Mocho Canyon [Jan.] (1; DHKa), Berkeley [Jan., May-June, Aug., Oct.-Dec.] (15; AMNH, CAS, CUIC, MCZ, USNM), Niles Canyon [Jan., Apr., June, Nov.-Dec.] (23; CAS, MCZ, UCB, UCD, USNM), San Leandro [May] (6; UCB, UCD), Sunol [Apr.-May, Sept.] (37; ANSP, CAS, UCB), Sunol Valley Regional

Park [Feb.] (8; GRNo); Amador Co., Sutter Creek [Aug.] (15; CAS),
 Volcano [June] (1; USNM); Butte Co., Oroville [Feb.] (1; UCB);
 Calaveras Co., [July] (3; CUIC), Mokelumne Hill [June-Aug.] (11; CAS,
 PADA, USNM, WSU); Contra Costa Co., [May] (4; CAS), Antioch (and 2 mi.
 e., [Mar.-May, Dec.] (16; CAS, UCB), Moraga [Oct.] (2; CAS), Mount
 Diablo [Oct.] (1; CAS), Orinda [Mar.] (1; UCB), San Pablo (San Pablo
 Canyon) [Apr., Nov.] (4; UCB, UCD); Del Norte Co., [May] (1; FMNH),
 Crescent City [Mar.] (4; CNC, UBC), Elk Valley (3.6 mi. ssw. on
 Griffin Creek [550m]) [Sept.] (2; CAS, DHKa); El Dorado Co., [June,
 Aug.] (13; FMNH, KSUC), Camino (3 mi. s.) [June] (1; UCB), Coloma
 [Apr.-May] (29; GRNo, USNM), Kyburz (2 mi. e. on South Fork American
 River [1340m]), (1; CAS), Lake Tahoe [July] (1; CAS), Riverton ([980m]
 and 3 mi. w. on South Fork American River [910m]) [July] (78; CAS,
 DHKa); Fresno Co., Fresno [July] (2; UMRM), Trimmer [May] (6; CAS,
 UBC); Glenn Co., Estell Creek (Logan Basin [1050m]) [July] (3; CAS),
 Orland (1.5 mi. n. at Stony Creek [110m]) [May] (25; DHKa); Humboldt
 Co., (10; AMNH, OSUC, USNM), Alton [May] (18; CDA, UCD), Arcata [June]
 (1; ANSP), Blocksburg [May-June] (13; CAS, UCB), Blue Lake (1 mi. s.)
 [Sept.] (1; CDA), Bridgeville (Van Duzen River) [June] (5; UASM, UCB),
 Capetown [Mar.] (3; JSch), Carlotta (Van Duzen River, and 6 mi. e.)
 [June] (49; RTBe, UASM, UCB, USNM), Dyerville [May-July] (4; RTBe,
 UCB, UCD), Eel River (11 mi. s. of Weott) [Mar.] (1; JSch), Fernbridge
 (Eel River) [June] (1; UASM), Fort Seward [May-June] (31; CAS, CUIC,
 RTBe, UCB, UIMI), Garberville [Mar., Sept.] (3; UIMI), Green Point
 [June] (4; CAS), Hoopa [June] (10; UASM), HumboldtGrove [July] (5;
 MSU), Orick [May, July-Aug.] (12; BFCa, CAS, CDA, DBUM), Patricks
 Point [Aug.] (1; MSU), Prairie Creek [July] (1; USNM), Redwood Creek

(3 mi. n. of road to Hoopa [200m], e. of Blue Lake on Highway 299, 17 mi. w. of Willow Creek [290m]) [June, Aug.] (5; CAS, UASM), Shively (2; CDA); Kings Canyon National Park, Cedar Grove [June] (5; CAS, UASM, UBC), Kings River Canyon [June] (10; KSUC, OSUC, UASM); Lake Co., Adams Springs [June] (1; CAS), Lower Lake [Sept.] (1; CAS); Lassen Co., Hallelujah Junction [July-Sept.] (5; CAS, CDA), Susanville (0.1 mi. w. at Susan River [1300m]) [May] (18; DHKa); Los Angeles Co., Coldbrook Ranger Station [June] (2; UCB), East Fork San Gabriel River (2.5 mi. e. of Highway 39 [530m]) [May] (1; DHKa), Mount Wilson [May] (2; UCR), Pasadena [May] (1; CAS), San Antonio Canyon [May] (2; GRNo), Switzers Camp [Aug.] (1; CDA), Trail Canyon (1; SFVS); Marin Co., [Mar.-Apr.] (4; CAS, USNM), Bon Tempe Lake [June] (1; CAS), Fairfax [Apr., June] (2; CAS), Lagunitas (Lagunitas Creek) [Mar.-June, Nov.] (11; AMNH, ANSP, CAS, CNC, MCZ, PADA), Mount Tamalpais [Sept.] (1; CAS), Muir Woods [May] (2; USNM), Nicasio Reservoir (0.5 mi. sw. at Lagunitas Creek) [Mar., June] (66; DHKa, PMCh), Taylorville [Dec.] (3; CUIC), Tocaloma (Lagunitas Creek) [May] (2; CAS); Mariposa Co., [July] (4; FMNH); Mendocino Co., [Aug., Oct.] (6; FMNH), Branscomb [July] (2; BFCa), Cummings (Rattlesnake Creek) [Sept.] (2; CAS), Fort Bragg [July] (1; DHKa), Hendy State Park (Navarro River) [June] (20; CDA), Howard Lake ([1200m]) [June] (1; UCB), Long Valley (n. of Willits) [Sept.] (2; CAS), Manchester area (Irish Beach) [Apr.] (1; JSch), McCoy Creek (s. of Piercy) [Sept.] (14; CAS), Ukiah [Mar.] (1; PURC), Westport [July] (3; BFCa), Willits (and 3 mi. w. at Baechtcl Creek) [June, Aug.] (2; MSU, USNM); Merced Co., Dos Palos [Sept.] (2; UASM), Snelling [Nov.] (1; USNM); Modoc Co., Adin (0.5 mi. n. at Rush Creek [1360m]) [May] (16; DHKa); Mono Co., Hot Creek [July] (2; UCD), Topaz Lake

(south end) [May] (1; DHKa); Monterey Co., Arroyo Seco Camp (Arroyo Seco Creek [520m]) [May] (15; DHKa, USNM), Big Sur (Big Sur River [90m], and 2 mi. e. at Ventana Campground) [Jan., May, July, Sept.] (55; CAS, DHKa, USNM), Carmel [Oct.-Nov.] (6; CAS, CUIC), Escondido Camp (2.4 mi. se. on Arroyo Seco Creek [620m]) [May] (2; DHKa), San Antonio River (10.6 mi. se. of Escondido Camp [400m]) [May] (8; DHKa), Tassajara Hot Springs [May, Sept.] (23; CAS, MCZ, UASM); Napa Co., Conn Lake [= Lake Hennessey] [Apr.] (1; UCB), St. Helena [July] (3; AMNH, ROM); Placer Co., (2; MCZ, USNM), Dutch Flat [Nov.] (5; CAS, CUIC), Foresthill [Oct.] (1; USNM); Plumas Co., [June] (1; FMNH), Highway 70 (21 mi. w. of Highway 395 [1370m]) [June] (1; UASM), Lake Almanor [July] (2; UCB), Massack (Greenhorn Creek at Massack Rest Area [1140m]) [July-Aug.] (5; CAS, MSU, UBC), North Fork Feather River [July] (1; MCZ), Quincy ([1040m]) [Aug.] (3; CAS); Sacramento Co., Carmichael [Mar.] (2; USNM), Sacramento (and at Sycamore Park) [July, Sept.-Oct.] (20; CAS, FMNH, INHS, MSU); San Bernardino Co., Baldwin Lake area ([2620m]) [Aug.] (3; UASM), Barton Flats (3 mi.e. at Santa Ana River headwaters [1940m]) [May] (37; DHKa), Bear Lake [Oct.] (2; CAS), Beaumont (8.6 mi. n. at Little San Gorgonio Creek [1340m]) [May] (29; DHKa), Big Pine Flat Campground (5.5 mi.sw.) [July] (1; GRNo), Colton [Oct.] (2; UMMZ), Forest Home [June, Sept.] (20; UCR), Lytle Creek [June] (6; CAS), Mill Creek (and 0.1 mi. e. of Forest Falls [1650m], 1.0 mi. ne. of Mill Creek Ranger Station [910m]) [May, Sept.-Oct.] (28; CAS, DHKa, GRNo), San Gorgonio Mountain ([2130m]) [Sept.] (5; CAS), South Fork Campground (1; GRNo); San Francisco Co., San Francisco [Apr.] (1; JSch); San Joaquin Co., [May] (2; FMNH), Banta [Nov.] (2; ICCM, USNM); San Mateo Co., (1; UWEM), Corte Madera Creek

(and near Portola Valley) [June, Aug., Oct.] (35; CAS, USNM), Gazos Creek (2 mi. e. of Cloverdale Road [15m]) [May] (5; DHKa), Jasper Ridge [May, Oct.] (3; CAS), La Cañada [Apr.] (1; CAS), La Honda (and 0.3 mi. n. at La Honda Creek [110m], 1.9 mi. w. at San Gregorio Creek [60m]) [May, July-Aug.] (81; CAS, DHKa, JSch), Loma Mar (Pescadero Creek [15m]) [May] (25; DHKa), Mindego Creek (at Alpine Road [120m]) [May] (11; DHKa), Pescadero (4.5 mi. e.) [Sept.] (4; USNM), Pescadero Creek [Aug.] (13; RFre), San Gregorio [June] (4; CAS), Searsville Lake (2; CAS), West Ridge [May] (1; CAS), Woodside (5 mi. w. on Highway 84) [June] (35; PMCh); Santa Clara Co., (12; FMNH, ICCM, UMRM, USNM), Alma [Oct.] (5; CAS, CUIC), Almaden [Apr.] (3; UCD), Anderson Reservoir (south end) [Jan.-Feb., May, Sept.] (39; DHKa, USNM), Arroyo Bayo [Apr.] (1; DHKa), Arroyo Mocho [Feb.] (1; DJLa), Corte Madera Creek [Apr.] (13; CAS), Gilroy (7 mi. e. at Coyote Creek) [Mar.] (3; DJLa, USNM), Gilroy Hot Springs (and 0.5 mi. w., 1.0 and 7.0 mi. s. on Coyote Creek) [May, July-Aug., Nov.] (17; CAS, DJLa, USNM), Isabelle Creek [Oct.] (2; UCB), Los Gatos [June] (2; CDA, USNM), Mount Hamilton [Apr., June] (11; UIMI, USNM), Pacheco Creek (and 7.9 mi. w. of Pacheco Pass [140m]) [May, July] (32; CAS, DHKa), Palo Alto [Oct.] (1; USNM), San Jose (and Alum Rock Park at Penitencia Creek [200m]) [Feb., Apr.-June, Oct.] (54; AMNH, CAS, CUIC, DHKa, MCZ, USNM), Saratoga (0.5 and 1.0 mi. w. on Saratoga Creek [170m]) [May, Sept.] (14; DHKa, USNM), Stanford University campus [May, Sept., Nov.-Dec.] (9; CAS, OSUO, USNM), Stevens Creek (at Stevens Creek County Park [170m]) [May-June] (7; DHKa, USNM), Stow Creek Canyon [Nov.] (1; USNM), Sveadal [Feb., Oct.] (7; DHKa, USNM), Uvas Creek (at Croy Road) [Feb.] (2; DJLa, USNM); Santa Cruz Co., [June, Aug.] (2; CAS, USNM), Aptos Creek

[May] (1; UCB), Ben Lomond [May, July, Sept.] (30; AMNH, CAS, LACM, MCZ, UASM, UBC), Big Basin Redwoods State Park [May] (1; USNM), Brookdale [Oct.] (4; CUIC), Corralitos [May] (9; CAS, KSUC), Felton [Sept.] (3; CUIC), Glenwood [May, Oct.] (3; CAS, CUIC), Hinckley Creek [May] (2; USNM), Mount Herman [July] (18; CAS, LACM), Santa Cruz [Apr., June, Sept.] (37; CAS, CDA), Scotts Valley (2 mi. n. on Glenwood Road at Bear Creek) [Apr.] (1; USNM), Zayante [May] (2; UIMI); Sequoia National Park, Giant Forest [Aug.] (4; CAS); Shasta Co., (16; AMNH, CUIC, USNM), Anderson (2 mi. n. at Sacramento River [1700m]) [May] (10; DHKa), Castella [July] (1; UMMZ), Dakkas Rock Picnic Area [Aug.] (1; GRNo), Hat Creek [June-July] (2; UCB, UCD), Hazel Creek [July] (1; AMNH), Old Station (Hat Creek [1400m]) [Aug.] (5; CAS, DHKa), Silverthorne [Feb.-June] (119; CDA); Sierra Co., Downieville [July] (3; AMNH); Siskiyou Co., [Sept.] (14; ANSP, KSUC, MCZ, PADA, USNM), Dunsmuir (4; ANSP, MCZ, USNM), Gottville (Klamath River) [June] (1; UASM), Klamath River (11 mi. w. of Klamath River Lodge) [May] (1; JSch), Pickawish Campground (84 mi. ne. of Willow Creek on Klamath River) [June] (9; UASM), Shasta Springs (Shasta Retreat [730m]) [June-July, Sept.] (12; ANSP, CAS, MCZ), Walker [June] (1; CAS); Solano Co., Rio Vista [June] (1; UIMI), Ryer Island [Jan.] (1; UCD), Winters (8 mi. w.) [Feb.] (6; USNM); Sonoma Co., [May, Aug.] (7; CAS, LACM, SDSU), Duncan Mills [July] (1; CAS), Forestville [Oct.] (2; CAS), Fort Ross [Nov.] (1; CAS), Guerneville [July-Aug.] (3; CAS), Guerneville Park [May] (3; UASM, USNM), Monte Rio (3 mi. n.) [Sept.] (1; CAS), Santa Rosa [Apr.] (6; OSUC, PURC, UMRM); Stanislaus Co., Knights Ferry [Apr.] (1; UCB); Sutter Co., Nicholas [Apr.] (1; CDA); Tehama Co., Child's Meadow (0.5 mi. w. at Mill Creek [1460m]) [May] (2; DHKa), Corning

[Oct.] (1; CAS), Cottonwood (0.1 mi. s. at Cottonwood Creek [170m]) [May] (31; DHKa), Dales (1.3 mi. sw. at Paynes Creek [260m]) [May] (17; DHKa), Mineral ([1520m], and 1.4 mi. w. at Battle Creek [1460m]) [May] (14; CAS, DHKa), South Fork Battle Creek ([300m]) [Apr.] (1; DHKa), Thomas Creek (2.5 mi. s. of Tehama exit on Interstate Highway 5 [120m]) [May] (50; DHKa); Trinity Co., [Sept.] (1; CAS), Burnt Ranch [Sept.] (40; CAS), Coffee Creek (at Coffee Creek Ranch [1070m]) [July] (17; CAS, DHKa), Hayfork (6 mi. ne. [790m]) [May] (6; UCB), Mad River (at Mad River Post Office) [May, Aug.] (8; DJLa, USNM), Ruth Reservoir (and 5.5 mi. se. of Ruth Dam) [Feb., Apr.] (4; DJLa, GRNo, USNM), Slate Creek (18.5 mi. sw. of Trinity Center on Highway 3 [730m]) [July] (4; CAS, DHKa), South Fork Salmon River (at Big Flat Campground [1490m]) [June-Aug.] (8; CAS, DHKa), Weaverville ([610m]) [Sept.] (2; CAS), Willow Creek (20 mi. e.) [Sept.] (2; MSU); Tulare Co., Kaweah (2; MCZ), Three Rivers (0.2 mi. sw. at South Fork Kaweah River [240m]) [June] (85; DHKa); Tuolumne Co., [May] (7; CAS, FMNH), Lyons Dam [June] (4; UIMI); Yolo Co., Cache Creek Canyon [Apr.] (1; USNM), Davis [Mar., Oct.] (2; PURC, USNM), Esparto (5 mi. w. at Salt Canyon) [May] (1; CDA), Putah Canyon [Feb., Apr.] (2; DHKa, USNM), Rumsey (26 mi. n.) [Apr.] (10; CDA), Winters (7 mi. e.) [Mar.] (2; USNM); Yosemite National Park, Yosemite Valley ([1220m]) [June, Aug.-Sept.] (15; FMNH, RTBe, SFVS, UWEM); County unknown, San Francisco Bay area (1; CAS), Santa Cruz Mountains [May] (2; USNM), Sylvania [Aug.] (2; MCZ). IDAHO: Clearwater Co., Orofino [Oct.] (6; WSU); Latah Co., Central Grade [Apr.] (1; UIMI), Juliaetta (and 4 mi. s.) [Apr., Nov.] (3; MSU, UIMI), Kendrick [May, Sept.] (6; UIMI), Meadow Creek Reservoir [Oct.] (1; UIMI), Moscow (3; UIMI), Moscow Mountain ([910m]) [Apr.] (5; UIMI),

Robinson Lake [Oct.] (1; UIMI), Troy [May] (5; UIMI, USNM, UWEM);
 Nez Perce Co., Clearwater River (3 mi. e. of Highway 95 on Highway
 12 [380m]) [May] (2; DHKa), Lapwai [Apr., Oct.] (5; UIMI), Lenore
 ([300m], and 6 mi. w. on Clearwater River) [May, July] (6; DHKa,
 UIMI, UWEM), Lewiston ([170m], and 2 mi. e. on Clearwater River
 [300m]) [Mar.-May, Aug.] (30; DHKa, GRNo, UIMI, UWEM), Myrtle [Apr.]
 (3; UIMI), Spalding [May] (1; OSUC), Webb [Oct.] (2; UIMI). NEVADA:
 (2; ANSP, INHS); Washoe Co., Franktown (3; MCZ, USNM), Lockwood (0.8
 mi. w. on Truckee River [1430m]) [July] (22; DHKa), Pyramid Lake
 [Aug.] (4; ILar), Reno [Aug.] (1; ILar), Verdi [June] (8; UIMI, USNM),
 Wadsworth (Truckee River [1340m]) [July] (2; DHKa). OREGON: (51; AMNH,
 CAS, FMNH, INHS, KUSM, MCZ, PURC, USNM); Baker Co., East Eagle Creek
 [July] (1; UWEM), Robinette [June] (27; UWEM); Benton Co., Alsea [Mar.]
 (1; OSUO), Blodgett [June] (2; CUIIC, MCZ), Coffin Butte [Sept.] (3;
 OSUO), Corvallis (and 5 mi. w.) [Mar.-June, Sept.] (43; CAS, CUIIC, LRus,
 MCZ, MSU, OSUO, UBC, USNM, UWEM), Marys Peak [June] (1; OSUO), Philomath
 (and 3 mi. nw. on Marys River) [Apr., July] (8; OSUC, OSUO, UWEM),
 William Finley Memorial Wildlife Refuge [June] (1; LRus); Clackamas Co.,
 (4; USNM), Brightwood (Salmon River [320m]) [July] (43; DHKa), Bull Run
 [Aug.] (1; OSUO), Clackamas River [May] (1; DHKa), Colton [Jan., Apr.]
 (3; CAS), Mollala (9.4 mi. sw. at Butte Creek [60m]) [July] (9; DHKa),
 Mollala River (at Highway 211 [80m]) [July] (84; DHKa), Sandy River
 [May] (4; JSch, MSU); Clatsop Co., Big Creek [July] (7; UWEM), Cannon
 Beach [June] (4; CAS); Columbia Co., Mist [July] (1; CAS); Coos Co.,
 Allegany [Oct.] (3; DHKa), Upper Cherry Creek (15 mi. sw. of Powers)
 [July] (2; OSUO); Crook Co., Prineville (Crooked River [910m]) [May]
 (2; DHKa); Curry Co., Brookings (and 7 mi. e. at Myrtle Grove on Chetco

River) [May, Sept.] (14; CAS, FMNH, OSUO, UWEM), Brush Creek (at Highway 101) [July] (1; MSU), Chetco River [Aug.] (24; LRus), Gold Beach [June] (1; CAS), Humbug Mountain State Park [May, Sept.] (8; FMNH, OSUO, UWEM), Loeb State Park [May] (6; UWEM), McGribble Campground [Aug.] (8; UWEM), Pistol River [May, July, Sept.] (13; FMNH, UWEM), Port Orford [July] (1; UWEM); Deschutes Co., Upper Deschutes River [May] (1; UWEM); Douglas Co., [June] (1; FMNH), Canyonville [Aug.] (4; UIMI, UWEM), Gardiner (5 mi. e.) [Apr., June] (4; JSch), Glide (7 mi. e.) [May] (2; OSUO), Myrtle Creek [June] (1; UWEM), North Umpqua River (at Toketee Lake [730m]) [July] (33; DHKa), Reedsport [July-Aug.] (7; JSch, RTBe), Roseburg (and 7 mi. nw.) [Apr.-May, Sept.] (9; FMNH, INHS, JSch, MCZ), Scottsburg (6 mi. e. at Weatherley Creek) [June] (1; JSch), Steamboat Creek (at North Umpqua River [320m], at Steamboat Falls [320m]) [July] (37; DHKa), Tillier (and 2 mi. e. at Tilson Creek) [May] (4; DHKa, JSch), Winchester (North Umpqua River) [Mar.] (1; JSch); Gilliam Co., Arlington (5 mi. w. on Columbia River) [Apr.] (1; JSch); Grant Co., Beech Creek (11.4 mi. n. of Mount Vernon [1230m]) [May] (1; DHKa), Monument (North Fork John Day River [690m]) [May] (72; DHKa), Mount Vernon (1.5 mi. e. at John Day River [940m]) [May] (17; DHKa), Picture Gorge (John Day River) [Aug.] (3; UWEM); Hood River Co., Hood River (and 0.2 mi. s. on Hood River [60m]) [May-July, Sept.] (162; CAS, DHKa, MCZ, OSUO, USNM); Jackson Co., Applegate (2 mi. w. on Applegate River [410m]) [May] (17; DHKa), Brownsboro [May] (7; DHKa), Buckhorn Mineral Spring [May] (2; JSch), Butte Falls (0.3 mi. e. at South Fork Butte Creek [730m]) [July] (19; DHKa), Dead Indian Soda Springs ([760m], and 3 mi. w.) [May, Oct.] (15; JSch, OSUO), Eagle Point [May] (2; UCD, UWEM), Gold Hill (Rogue River) [Oct.] (4; OSUO, UWEM), Jacksonville

[May] (5; JSch, NMDo), Klamath Junction (2.8 mi. e. at Emigrant Creek [730m]) [May] (46; DHKa), Little Applegate River ([700m]) [Aug.] (1; FMNH), Medford [May-June] (37; UCD, UWEM), Rogue River (11.9 mi. sw. of Union Creek [760m]) [July] (71; DHKa), Rogue River City (2 mi. e. on Rogue River [300m]) [Sept.] (96; DHKa), Ruch (4 mi. s., 4.5 mi. s. at Little Applegate River [520m], 10 mi. s. at Applegate River [520m]) [May] (42; DHKa, LRus, ODA, OSUO), Shady Cove (6.3 mi. nw. at Elk Creek [410m], at Rogue River) [May, July] (109; DHKa, JSch), Star Ranger Station [Mar.] (2; UCD), Tou Velle State Park (Rogue River [380m]) [May] (62; DHKa, LRus), Trail [May] (1; JSch), White City (1.5 mi. n. on Agate Road at Little Creek [400m]) [May] (71; DHKa), Wimer [May] (3; UWEM); Josephine Co., [June-July] (9; FMNH), Applegate River (at Highway 199) [May] (1; DHKa), Cave Junction (1 mi. s. at East Fork Illinois River [440m]) [May] (106; DHKa), Golden (12; UWEM), Grants Pass (and 7 mi. w. at Applegate River) [May, July-Aug.] (20; AMNH, LRus, OSUO), Grave Creek [May] (7; FMNH, UWEM), Grayback Creek (w. of Oregon Caves [580m]) [June] (2; UWEM), Illinois River (headwaters) [May] (9; CAS, JSch, UBC), Selma (and 3 mi. n. [470m], 0.5 [440m] and 1.0 mi. s. at Deer Creek) [May] (22; DHKa, JSch, OSUO), Wolf Creek (4 mi. s.) [Mar.] (1; JSch); Klamath Co., Keno (7 mi. w.) [May] (2; JSch); Lane Co., Cottage Grove [June] (8; UWEM), Eugene [May-July, Sept.-Oct.] (17; CAS, FMNH), Nimrod (0.9 mi. w. at McKenzie River [270m]) [July] (42; DHKa), North Fork McKenzie River (at Boulder Creek [520m]) [July] (5; DHKa), Oakridge (Salmon Creek [350m], 4.6 mi. nw. at Willamette River, and 9.5 mi. se. at Salt Creek [610m]) [June-July] (164; DHKa, USNM), Salmon Creek (10.6 mi. e. of Oakridge at Blue Pool Campground [610m]) [June] (2; USNM), Vida [Sept.] (7; UMI); Lincoln

Co., Nashville [June] (22; ICCM, LACM, MCZ, UASM), Otis [July] (1; BFCa), Tidewater (7 mi. e. at Mike Bauer Campground) [Aug.] (1; RTBe); Linn Co., [Oct.] (2; OSUO), Albany [June] (5; CAS), Foster [July] (9; OSUO), North Santiam River (1; ICCM); Marion Co., Detroit (and 2.5 mi. e. on North Santiam River [490m]) [June-July, Sept.] (36; CAS, DHKa), Mill City (7.4 mi. w. at Little North Santiam River [200m]) [July] (11; DHKa), Silver Creek Falls [July-Aug.] (3; UWEM); Morrow Co., Heppner Junction (5 mi. e. at Columbia River [180m]) [May] (2; DHKa); Multnomah Co., Horsetail Falls [June] (1; DHKa), Multnomah Falls [May] (1; UWEM), Portland [Apr., June-July, Sept.] (36; ANSP, CAS, DEUN, FMNH, ISUI, MCZ, OSUO, PADA, USNM, UWEM, WSU), Rooster Rock State Park (2 mi. e. of Corbett) [May] (7; DHKa, OSUO), Wahkeena Falls ([90m]) [July] (1; DHKa); Polk Co., Rickreall [Apr.] (12; UWEM); Sherman Co., John Day River (at Highway 30) [May] (1; JSch); Tillamook Co., Beaver [July] (2; MSU), Garibaldi (2 mi. e. at Miami River) [Apr.] (2; JSch), Lee's Camp (Wilson River) [Apr.] (2; MSU), Nehalem Creek [June] (6; UWEM), Tillamook [Sept.-Oct.] (6; UWEM); Umatilla Co., Cottonwood Creek [June] (1; USNM), Echo (Umatilla River [290m]) [May] (5; DHKa), Freewater [Sept.] (7; OSUO, USNM), Meachem (2 mi. sw. at Meachem Lake [1190m]) [Aug.] (3; UASM), Milton (and 7 mi. e., Walla Walla River) [Apr.-June, Sept.] (7; CAS, JSch, UIMI, UWEM), Rieth (5.9 mi. w. at Umatilla River [370m]) [May] (11; DHKa), south of Kooskooskie (Washington) [Oct.] (3; UWEM), Umatilla [June, Aug.] (8; MCZ, UWEM); Union Co., Elgin (0.1 mi. s. at Grande Ronde River [1130m], 3.1 mi. nw. at Little Phillips Creek [1020m]) [May] (14; DHKa), La Grande (and 1 mi. ne. at Grande Ronde River [1070m]) [May, Aug.] (18; DHKa, UWEM), Morgan Lake [June] (1; UIMI); Wasco

Co., The Dalles (and 5 mi. s. at Eightmile Creek) [Apr.-May] (17; CAS, FMNH, JSch, PURC, USNM), Tygh Creek (at Highway 197) [June] (7; JSch), Tygh Valley (2 mi. n. [410m]) [May] (4; OSUO), Warm Springs Indian Reservation (Hot Springs) [May] (8; JSch, MSU); Washington Co., Dilley (1; FMNH), Gales Creek [Apr.] (1; MSU); Wheeler Co., John Day River (0.4 mi. s. of west junction of Highways 19 and 207 [560m]) [May] (72; DHKa), Spray (John Day River [580m]) [May] (7; DHKa), West Branch Bridge Creek (16.0 mi. sw. of Mitchell [1070m]) [May] (47; DHKa); Yamhill Co., [Sept.] (1; CAS), Dayton (Dorsey Gravel Bar, Willamette River) [Apr.-May, July] (8; DHKa, UWBM), McMinnville (and 3 mi. nw.) [Feb., June-Aug.] (15; UCR, USNM, UWBM), Newberg [Oct.] (1; UWBM); County unknown, Farmers River [June] (1; UWBM). WASHINGTON: (58; AMNH, ANSP, CAS, FMNH, ICCM, INHS, MCZ, OSUC, ROM, USNM); Adams Co., Washtucna [May] (1; LRus); Asotin Co., Asotin (Asotin Creek [370m], Snake River) [May-June] (12; CAS, DHKa, OSUO), Buford Creek (3.6 mi. s. of Grande Ronde [760m]) [May] (118; DHKa), Clarkston [May, Aug.] (18; UIMI, UWBM), Grande Ronde River (at Highway 129 [550m]) [May, Sept.] (26; DHKa, SJSC); Benton Co., Kennewick [Sept.] (1; UWBM), Plymouth [Sept.] (4; UWBM), Richland [Apr.-May] (11; FMNH, UWBM); Clallam Co., Forks [July] (31; CAS), Klahowya State Park (Soleduck River) [June] (4; CAS), La Push [May] (6; CNC), Mora [Sept.] (1; UWBM); Clark Co., Battle Ground (1 mi. s. at East Fork Lewis River [80m]) [May] (10; DHKa), Lewisville Park [June] (1; MSU), Vancouver (2; CAS), Washougal [May, Sept.] (4; UWBM); Columbia Co., Central Ferry [Sept.] (14; UWBM), Dayton (and at Petit Creek [580m], Touchet River [580m]) [May, July, Sept.] (30; CUIIC, DHKa, WSU), Tucannon River (at Highway 12 [370m])[May] (2; DHKa); Cowlitz Co., Ariel [May] (3; UWBM), Castle Rock

[Sept.] (1; UWEM), Longview (5 mi. se. at Carrols Hill, 9 mi. w. at Columbia River) [Mar., Aug.] (2; DHKa), North Fork Toutle River (14 mi. e. of Toutle [300m]) [Aug.] (11; CAS, DHKa), South Fork Toutle River [July] (1; UWEM), Toutle [May, Sept.] (3; CNC, USNM), Toutle River [May] (7; UWEM); Franklin Co., Palouse Falls State Park [May] (6; LRus), Pasco [May] (82; MCZ, UWEM, WSU), Perry [May] (1; ICCM); Grays Harbor Co., Lake Quinault [May] (2; CAS), Melbourne [July] (1; CAS), Schafer State Park [Aug.] (2; RTBe); Island Co., Whidbey Island (Coupeville, Saratoga Beach) [June-July] (2; UWEM); Jefferson Co., Clearwater (1 mi. s.) [June] (3; CDA), Port Townsend [July] (1; MCZ); King Co., Auburn [Aug.] (4; UWEM), Bellevue [July] (1; UWEM), Carnation (and at Snoqualmie River) [May] (29; LRus, UWEM), Cedar Mountain [May, July] (69; UWEM), Cedar River [Mar., May] (3; UWEM), Fall City (Snoqualmie River) [Sept.] (10; UWEM), Green River (and at Green River Gorge) [Apr.-May, Aug.] (11; UWEM), Issaquah (and 6 mi. e.) [June] (4; ALar, LRus), Maple Valley (Cedar River) [May] (5; UWEM), North Bend (and Snoqualmie River at Maloney's Grove) [May-Sept.] (36; FMNH, ICCM, MCZ, SDSU, UIMI, UWEM), Renton (Cedar River) [May-June, Sept.] (74; UWEM), Seattle (and Carkeet Park, Golden Gardens, Woodland Park) [Apr.-Aug., Oct.] (63; CAS, DHKa, FMNH, KSUC, USNM, UWEM, UWEM, WSU), Snoqualmie [May] (1; UWEM), Snoqualmie River (at Snoqualmie Falls) [Apr.-May, July-Sept.] (17; SDSU, UWEM), Tokul [Aug.] (1; UWEM); Kitsap Co., Bainbridge Island [Oct.] (2; CAS), Gilberton [June] (1; UWEM); Kittitas Co., Ellensburg [May] (2; UWEM); Klickitat Co., Rock Creek (15.6 mi. e. of Goldendale [430m]) [May] (93; DHKa), Spearfish [June] (2; FMNH), Spring Creek (10 mi. sw. of Bickelton [1010m]) [May] (108; DHKa), White Salmon [June] (1; UWEM); Lewis Co., Carlson (8.4 mi. s.

at East Fork Tilton [350m]) [July] (31; DHKa), Chehalis [May, Aug.] (5; CAS, UWEM), Cinebar [June] (1; CDA), Curtis (1 mi. n. at Chehalis River [140m]) [May] (5; DHKa), Newaukum River [Aug.] (2; UWEM), Pe Ell (Chehalis River [180m]) [May] (6; DHKa), Packwood (3.0 mi. ne. at Lake Creek [370m]) [July] (1; DHKa), Rainbow Falls State Park [Aug.] (6; CAS), Toledo (1 mi. s. at Salmon Creek [90m]) [May] (7; DHKa); Mason Co., Harstine Island [Sept.] (1; MSU), Skokomish River [May] (1; USNM); Olympic National Park, Hoh River (at Hoh River Campground, at Jackson Campground) [July-Aug.] (4; FMNH, ROM); Pacific Co., Bay Center [Aug.] (6; UWEM), Long Beach [July] (1; UWEM), Nasel River [June] (4; UWEM), Seaview [July] (1; UWEM), Trap Creek [July] (1; CAS); Pierce Co., Ashford (4 mi. e. on Nisqually River at Goat Creek [590m]) [July] (2; DHKa), Elbe (Nisqually River [400m]) [July-Aug.] (137; DHKa), Electron [May] (2; UWEM), Nisqually River [Mar.] (7; GRNo, LACM), South Prairie [Oct.] (5; FMNH); Skamania Co., Carson (8 mi. n. at Wind River [340m]) [May] (1; DHKa), Columbia River (15 mi. w. of Underwood [10m]) [May] (13; DHKa), North Bonneville (1 mi. w. at Hamilton Creek [50m]) [May] (29; DHKa); Snohomish Co., Arlington (North Fork Stillaguamish River) [Aug.] (12; UWEM, WSU), Cicero (North Fork Stillaguamish River) [Aug.] (1; UWEM), Lake Stevens [May] (1; UWEM), Monroe [July] (2; CAS), North Fork Stillaguamish River [May] (1; UWEM), Stillaguamish River [Mar.] (1; UWEM), Sultan [Apr.] (2; UWEM); Spokane Co., Spokane [Aug.] (2; LACM); Thurston Co., Deschutes River [May] (3; UWEM), Olympia (and Madrona Beach) [May-July] (12; MCZ, UWEM), Tenino (6; USNM); Walla Walla Co., Coppei [May] (7; ICCM, MCZ, UIMI), Kooskooskie [Apr., June, Aug.] (19; JSch, PUCA, UCD, UWEM), Snake River (at Columbia River) [Aug.] (2; CAS), Touchet

River (near Waitsburg) [July] (5; DJLa), Walla Walla (and Mill Creek, 2 mi. s. at Walla Walla River [320m]) [Apr.-Sept.] (81; CAS, DHKa, MCZ, NMDo, OSUO, PURC, UIMI, USNM, UWBM, WSU), Wallula [Apr.] (1; UIMI); Whatcom Co., Lynden [Mar.-Apr., June, Sept.] (13; LRus); Whitman Co., Almota (and Smockle Creek) [Mar.-May, Aug.] (40; CAS, MCZ, UIMI, UWBM, WSU), Palouse [Aug.-Sept.] (5; UWBM, WSU), Pullman [Apr.-July, Sept.-Oct.] (58; CAS, FMNH, ICCM, NMDo, UWBM, WSU), Snake River [June] (2; UWBM), Wawawai (and 0.2 mi. ne. in Wawawai Canyon [340m], 2.8 mi. nw. on Snake River [300m]) [Mar.-May, July-Aug., Sept.] (97; CAS, DHKa, DJLa, FMNH, MCZ, PURC, USNM, UWBM, WSU), Wilma [Apr.-May] (4; FMNH, PURC, UWBM).

State Unknown. Service Creek [Aug.] (1; CAS), Shadow Lake [May] (2; UWBM), Snake River [Oct.] (1; WSU).

Doubtful Records. UNITED STATES OF AMERICA, COLORADO: Garfield Co., Glenwood Springs [July] (2; ALar, DBUM).

No Data. (5; INHS, MCZ, USNM).

Nebria fragilis Casey

Map: Figure 394

Nebria fragilis fragilis Casey

Specimens examined: 390 (251♂, 139♀)

UNITED STATES OF AMERICA

UTAH: (1; ANSP); Salt Lake Co., Alta [June] (9; ANSP, USNM); Sanpete Co., Ephraim Creek ([2900m]) [Aug.] (1; USNM); Utah Co., American Fork Canyon ([2900m], 5.1 mi. e. of Highway 146 [1860m], American Fork River

at Little Mill Campground [1830m]) [June, Aug.] (151; ANSP, DHKa, MCZ, USNM), Aspen Grove [Aug.] (1; CAS), Mount Timpanogos [July] (37; CAS), North Fork Provo Canyon (1.5 mi. n. of Highway 189 on North Fork Provo River [1680m], Sundance Ski Area [1890m]) [Aug.] (115; DHKa, FMNH, USNM), Provo Canyon [July] (1; CAS), South Fork American Fork Canyon (6.4 mi. e. of Highway 146 [1980m]) [Aug.] (76; DHKa).

Nebria fragilis teewinot Kavanaugh, NEW SUBSPECIES

Specimens examined: 379 (220♂, 159♀)

UNITED STATES OF AMERICA

WYOMING: Grand Teton National Park, Mica Lake ([2970m]) [July] (1; DHKa), Mount Teewinot (southeast slope [2160m-2740m]) [Aug.] (79; DHKa), South Fork Cascade Canyon ([3080m]) [July] (1; SJSC), South Fork Garnet Canyon ([2820m]) [July] (1; SJSC), Timberline Lake area [July] (1; DHKa); Lincoln Co., White Creek (20 mi. se. of Alpine Junction [1950m-2190m]) [Aug.] (40; DHKa), Wolf Creek (16.1 mi. sw. of Hoback Junction [1770m-1780m]) [July-Aug.] (137; DHKa); Sublette Co., Green River Lakes (west shores [2440m-2590m]) [July] (53; DHKa), Hoback River (14 mi. sw. of Highway 187/189 [2440m]) [July] (11; DHKa); Teton Co., Alaska Basin (near Sunset Lake [2940m]) [July] (1; SJSC), Granite Creek (at Granite Falls [2160m]) [July] (37; DHKa), Togwotee Pass ([2960m] and 3.7 mi. wnw. at Blackrock Creek [2770m]) [Aug.] (20; DHKa, KUSM).

Nebria frigida R. F. Sahlberg

Map: Figure 389

Specimens examined: 295 (173♂, 122♀)

CANADA

BRITISH COLUMBIA: Sikanni Chief River (Alaska Highway mi. 160) [June] (2; UASM), Swift River (Alaska Highway mi. 733.3) [June] (3; UASM).

NORTHWEST TERRITORIES: Aklavik [June-Aug.] (17; CAS, DHKa), Anderson River Delta (Eagle Perch Island) [July] (2; UASM), Fort McPherson [June-July, Sept.] (3; CNC, DHKa), Kittigazuit [July] (1; CNC), Mackenzie River Delta [June] (1; AMNH), Norman Wells [Aug.] (1; DHKa), Reindeer Depot [July] (2; CNC). YUKON TERRITORY: District of

McKenzie, Dawson [June] (1; CAS), Dempster Highway (mi. 35 [880m]) [July] (14; CNC), Firth River [Aug.] (1; CNC), Morley River (Alaska Highway mi. 777) [Aug.] (1; DHKa), North Fork Crossing ([1070m]) [June-July] (4; CNC), North Fork Klondike River (1; CNC), Rampart House [May-June] (3; CNC, USNM), Snag [July] (1; CNC), Swift River (Alaska Highway mi. 733) [Aug.] (1; DHKa).

UNITED STATES OF AMERICA

ALASKA: [July] (19; CAS, DHKa, USNM, UWBM); Mount McKinley National Park [July-Aug.] (4; CUIC, MCZ, USNM, UWBM), Savage River (1.2 mi. n. of Denali Highway [730m-760m]) [July] (9; DHKa); Other localities, Anvik (Yukon River) (1; USNM), Big Gerstle River (Alaska Highway mi. 1393) [June] (1; MCZ), Black Rapids Glacier (Richardson Highway mi. 227) [July] (5; USNM), Chatanika River (at Chatanika River Campground [240m]) [July] (20; DHKa), Chena River (2 mi. w. of Fairbanks at Chena River Campground [140m]) [July] (6; DHKa), Chitina Glacier (30 mi. n. of Mount St. Elias) [May-June] (1; USNM), Deering [Aug.-Sept.] (2; JVMA), Delta River [Aug.] (1; JVMA), Eagle Summit (Steese Highway mi.

108 to 109 [1100m-1190m]) [July] (28; DHKa, MCZ, UASM), Fairbanks (6; UASM), Fort Yukon (1; UWBM), Holy Cross (8 mi. n. at Yukon River) [July] (1; USNM), King Salmon (Naknek River) [July] (8; CNC), Knik River (at Glenn Highway) [July] (1; UASM), Kugruk River (90 mi. n. of Nome) [July] (2; CAS), Kuzitrin River (at Copper Creek) [July] (2; JVMA), Little Nelchina River (Glenn Highway mi. 138) [July] (2; MCZ, UASM), Pavlof Volcano [Sept.] (6; CAS), Nome [June-Aug.] (60; CAS, ICCM, INHS, JVMA, MCZ, USNM, UWBM), Nunivak Island [Aug.] (1; USNM), Paimuit (30 mi. wsw. at Yukon River) [July] (1; USNM), Point Barrow [June] (3; UMMZ), Ptarmigan Creek (Steese Highway mi. 101.1 [730m]) [July] (4; DHKa), St. Michael [July] (4; CAS, MCZ), Security Cove (Kuskokwim River) [July] (1; USNM), Seward [June] (1; ICCM), Solomon River (37 mi. e. of Nome) [Aug.] (1; MCZ), Teller [June, Aug.] (6; CAS, USNM), Tolstoi [July] (1; USNM), Ukak [July] (1; PURC); Aleutian Islands, Unalaska Island (Unalaska) [July] (2; ICCM); Pribilof Islands, St. George Island [June] (1; ICCM).

Nebria gebleri Dejean

Map: Figure 402

Nebria gebleri gebleri Dejean

Specimens examined: 2277 (1179♂, 1098♀)

CANADA

ALBERTA: [July] (2; BFCa, UASM); Banff National Park, Banff [May-Sept.] (107; AMNH, BFCa, CAS, CNC, CUIC, DBUM, DHKa, KSUC, KUSM, MCZ, UASM, UCD, USNM, UWBM), Bow River ([1830m]) [July] (5; CNC), Cascade

River (near Banff) [Aug.] (2; CAS, MCZ), Eisenhower Junction ([1430m])
 [July] (1; CNC), Johnson Creek Trail (at Johnson Creek Campground)
 [July] (9; ROM), Lake Agnes [Aug.] (1; CUIC), Lake Louise [June-Sept.]
 (40; AMNH, CAS, CUIC, MCZ, SJSC, UASM, UBC, USNM), Lake Minnewanka
 [Aug.-Sept.] (6; AMNH, DJLa, UASM), Moraine Lake [July-Aug.] (12; CAS,
 CNC, UASM), Ptarmigan Lake ([2290m]) [July] (2; CNC), Waterfowl Lake
 Campground [Aug.] (1; SJSC); Jasper National Park, Amethyst Lake Trail
 ([1710m]) [July] (5; DHKa), Astoria River ([1770m]) [Aug.] (7; DJLa,
 GRNo, USNM), Geikie Road (Miette River) [Aug.] (1; CNC), Geraldine
 Lakes [July] (7; USNM), Jasper [Aug.-Sept.] (3; MCZ, UBC), Miette Hot
 Springs (Sulphur Creek) [July-Aug.] (26; DHKa, MCZ), Miette River (at
 Meadow Creek [1100m]) [July] (28; DHKa), Mount Edith Cavell ([1370m-
 1770m]) [Sept.] (13; DHKa, UAFA), Portal Creek ([1190m]) [Aug.] (1;
 DJLa), Pyramid Lake [Sept.] (2; RTBe); Waterton Lakes National Park,
 Cameron Lake area ([1660m-1980m]) [July] (6; UASM), Red Rock Canyon
 [July-Aug.] (11; CAS, DJLa, UWBM), Twin Lakes ([1120m]) [July] (4;
 DJLa), Waterton Park [July-Aug.] (34; CAS, CDA, CNC, LACM, LEMC, MCZ,
 UASM, UBC, UCD); Other localities, Bellevue (2 mi. w. at Gold Creek
 [1370m]) [July] (4; DHKa), Belly River [July] (1; CAS), Blakiston
 Creek [July] (21; UASM), Cadomin [June] (1; UASM), Calgary [June] (3;
 BFCa), Cardinal River [May] (2; DHKa), Cline River (at Highway 11)
 [Aug.] (2; DHKa), Crowsnest Pass [Aug.] (3; CNC, UASM), Entrance (20
 mi. nnw. on Grande Cache Road at Wildhay River [1310m]) [June] (10;
 DHKa), Fort Macleod [Aug.] (1; USNM), Gap [Aug.] (1; CAS), Gorge Creek
 [July] (7; UASM), Happy Valley [May, Aug.] (4; AMNH, UASM, USNM),
 Highwood Pass ([2380m]) [July] (6; CNC), Jumpingpound Creek (20 mi.
 sw. of Highway 1) [June] (7; DHKa), Lusk Creek [July] (15; CNC), Marmot

Creek Basin ([1980m]) [July] (7; CNC), Mill Creek Ranger Station [Aug.] (2; CAS, UBC), Nordegg (South Creek Bridge) [July] (8; DJLa, UASM), North Saskatchewan River (near Nordegg) [July] (3; RFre), Pincher Creek ([1620m]) [July] (5; DJLa), Sheep River (4.5 mi. above Gorge Creek) [Aug.] (8; DHKa), Spionkop Creek ([1740m]) [July] (3; DJLa), Spray Lakes [July] (3; JVma), West Branch Castle River ([1340m]) [Aug.] (5; DJLa), Willow Creek [Aug.] (1; CAS). BRITISH COLUMBIA: (1; MCZ); Glacier National Park [July] (8; ROM), Glacier [June-Aug.] (25; ANSP, BFCa, CAS, USNM), Illecillewaet Campground [July] (12; DHKa, GRNo, USNM), Loop Creek [June] (1; UASM), Rogers Pass ([1370m]) [Aug.] (2; CUIC); Kootenay National Park [July-Aug.] (9; CAS, CNC, UBC), Kimpton Creek ([1220m]) [July] (2; CNC), Kindersley Pass ([2130m]) [July] (2; CNC), Marble Canyon [July-Aug.] (2; CAS), McLeod Meadows [July] (1; CNC), Sinclair Creek ([1830m]) [June-Aug.] (59; CAS, CNC, ISUI, KSUC, MCZ, ROM, UASM, UBC), Vermillion Creek [July] (1; CNC); Mount Revelstoke National Park ([1370m]) [July-Aug.] (9; BFCa, CNC); Yoho National Park [July-Aug.] (5; BFCa, UWBM), Amiskwi River (and at Amiskwi Falls [1830m]) [Aug.] (13; CNC), Field (Kicking Horse River) [July-Aug.] (5; CAS, UBC, USNM), Hector [June] (1; USNM), Kicking Horse Pass (1; ROM), Kicking Horse River (at Amiskwi River) [Aug.] (1; DHKa), Lake Oesa ([2130m]) [July] (6; CNC), Lake O'Hara [July] (2; CAS), Otterhead River ([1680m]) [Aug.-Sept.] (33; CNC, DHKa), Wapta Lake ([1580m]) [July] (1; CAS), Yoho River (4 to 12 mi. ne. of Field, at Takkakaw Falls [1520m]) [July-Aug.] (39; DHKa, MCZ, UASM); Other localities, Barkerville (Grouse Creek) [Aug.-Sept.] (8; UBC), Big Boulder Creek (e. of Pine Pass) [June] (4; CNC, UASM), Birch Creek [July] (1; CAS), Bridesville [May] (1; CAS), Cabin Creek ([1520m])

[July-Aug.] (24; CNC, UASM, UBC), Cherryville [July] (3; CAS, UBC), Cottonwood [July] (1; CAS), Couldrey Creek ([1520m]) [Aug.] (1; UBC), Creston (8 mi. w.) [June] (4; CNC), Crowsnest Pass (2 mi. w. [1280m], 5 mi. w. at Elk River [1220m]) [July] (21; DHKa), Duck Creek (near Wyndel) [June] (1; UASM), Elk Creek (east of Fernie) [July] (1; UASM), Erickson [Aug.] (3; UBC), Fernie (Coal Creek) [July-Aug.] (19; BFCa, CAS, CUIC, UBC), Flathead [June] (2; UBC), Glenora (1; USNM), Golden (9 mi. e. at Kicking Horse River [1160m]) [June, Aug.] (4; DHKa, USNM), Grave Creek (15 mi. n. of Michel [1740m]) [Aug.] (7; UBC), Invermere [July] (2; CNC), Kalum Lake (13 mi. n. of Terrace) [June] (1; UASM), Kaslo [June] (13; USNM), Kay Falls [July] (18; CAS, CNC, DBUM, ISUI, UBC), Kitchener [Aug.] (8; UBC), Kootenay River (at Highway 3) [Aug.] (4; UASM), Moberly Lake Provincial Park [July] (7; DHKa), Mount Robson Provincial Park (Mount Robson [1830m]) [July] (23; ANSP, UASM), Muncho Lake Provincial Park (Peterson Creek at Alaska Highway mi. 445) [July-Aug.] (21; CNC, UASM), Natal (at Hope Trail) [June] (1; RFre), Osoyoos (1; MCZ), Price Creek (near Kitwanga) [June] (1; UASM), Prince Rupert [July] (1; CUIC), Radium Hot Springs [July-Aug.] (7; CAS, CNC, UBC), Retallack [Aug.] (3; BFCa), Rock Creek [July] (5; CAS, MSU), Rossland (2 mi. w.) [May] (5; CNC, UASM), Sanca [Sept.] (3; UBC), Shuswap Falls [June] (1; DBUM), Slide Mountain (10 mi. e. of Barkerville [1370m]) [June] (2; CNC), Slocan [Aug.] (1; BFCa), Stanley [July] (23; CAS, CNC, FMNH, ISUI, MSU, UBC, UMMZ), Summit Creek (near Creston) [Aug.] (1; UASM), Summit Lake (Alaska Highway mi. 392 [1520m]) [June-July] (7; CNC), Swift River (Alaska Highway mi. 733.3) [Aug.] (1; LRus), Tetsa River (Alaska Highway mi. 376 and mi. 390) [Aug.] (3; LRus, MSU), Trinity Valley [June-July]

(6; ALar, DBUM, FMNH), Two Sisters Mountain (15 mi. e. of Barkerville [1680m]) [June] (3; CNC), Tyee (2.6 mi. nw.) [June] (1; UASM), Wyndel [July] (4; BFCa, CNC, UBC). YUKON TERRITORY: Rancheria (Swift River) [Aug.] (30; ALar, CNC, UASM), Swift River (Alaska Highway mi. 733) [June, Aug.] (6; CNC, DHKa).

UNITED STATES OF AMERICA

ALASKA: Baranof Island (Sitka) (1; MHNP), Haines (8 mi. nw., 13 to 14 mi. n.) [June-July] (5; CNC, MCZ), Thane [July] (1; UWBM). IDAHO: [May] (1; UIMI); Adams Co., Bear [July] (1; BFCa), Huntley Gulch (2 mi. nne. of Cuprum [1250m]) [Aug.] (3; DHKa), Indian Creek (1 mi. nne. of Cuprum [1370m]) [Aug.] (3; DHKa), New Meadows [June] (14; UIMI, USNM, UWBM); Blaine Co., Cherry Creek (0.1 mi. nw. of Highway 93 [2230m]) [Aug.] (9; DHKa), Dollarhide Summit (2 mi. e. at North Fork Warm Springs Creek [2350m-2410m]) [Aug.] (37; DHKa), Galena Summit (2.4 mi. ne. [2320m]) [Aug.] (15; DHKa), Hyndman Creek [July] (24; FMNH, UWBM), Ketchum (10 mi. w. at North Fork Warm Springs Creek) [Aug.] (4; DHKa), Petit Lake Creek (at Twin Lakes Trail [2130m-2440m]) [Aug.] (30; DHKa); Boise Co., Crouch (South Fork Payette River [910m]) [Aug.] (6; RTBe), Lowman [June-July] (3; BFCa, RTBe); Bonner Co., Sandpoint [July] (1; NMDo), Soldier Creek (at Priest Lake) [July] (4; CAS); Camas Co., Carrie Creek (32 mi. [2440m] and 36 mi. wsw. of Ketchum) [Aug.] (35; DHKa), Skeleton Creek (14 mi. e. of Featherville on South Fork Boise River [1550m]) [Aug.] (21; DHKa), South Fork Boise River (34 mi. e. of Featherville [1830m] at Bear Creek) [Aug.] (42; DHKa); Custer Co., Bayhorse Creek (7 mi. nw. of Highway 93 [2440m]) [Aug.] (18; DHKa), Fourth of July Creek (3 mi. e. of Highway 93 [2230m]) [Aug.] (67; DHKa), Lower Stanley

(Salmon River [1800m]) [Aug.] (1; DHKa), Trail Creek Summit (2 mi. e. at Summit Creek [2320m]) [Aug.] (17; DHKa); Elmore Co., Rocky Bar ([1830m]) [June] (4; UWBM); Idaho Co., Orogrande Creek [Aug.] (1; UWBM); Lemhi Co., Salmon [July] (1; EMUS); Shoshone Co., Burke [June, Aug.] (2; UIMI), Wardner (1; CAS); Valley Co., Dagger Falls [July] (2; BFCa), Middle Fork Salmon River (near Boundary Creek) [Aug.] (11; RTBe); County unknown, Twin Creek Forest Camp ([1520m]) [July] (50; FMNH, UWBM).

MONTANA: (2; CAS, FMNH); Cascade Co., Belt Creek (1 mi. [1400m] and 17 mi. [2100m] s. of Monarch) [July] (82; DHKa), Jefferson Creek (2 mi. e. of Highway 82 [1870m]) [July] (9; DHKa); Chouteau Co., Briggs Creek (at North Fork Highwood Creek [1370m]) [July] (32; DHKa), Highwood Creek (26 mi. ne. of Belt [1310m]) [July] (2; DHKa), South Fork Highwood Creek (at Big Coulee [1490m]) [July] (29; DHKa); Flathead Co., Hungry Horse Reservoir [July] (4; LRus); Glacier National Park [June-Aug.] (41; CAS, CUIC, DHKa, SJSC, USNM, UWBM), Baring Creek [Aug.] (9; UWBM), Canyon Creek (at Lake Sherburne) [July] (6; CAS), Fish Creek Campground ([1280m]) [July] (11; LRus), Going-to-the-Sun Chalet [Aug.] (24; UWBM), Grinnell Glacier [Aug.] (1; SJSC), Hidden Pass ([2130m]) [Aug.] (1; DHKa), Lake McDonald (and at Sprague Creek) [June-Aug.] (7; CAS, RTBe, SJSC, UWBM), Logan Pass (Granite Park [1520m]) [July] (2; LRus), Many Glacier ([1680m]) [July] (3; LRus), Mount Reynolds area ([2590m]) [Aug.] (1; SJSC), Piegan Pass ([2410m]) [Aug.] (2; SJSC), St. Mary Lake [July] (3; CAS, USNM), St. Mary River [Aug.] (1; CAS), Sperry Chalets [July] (1; SJSC), Swiftcurrent Creek [July] (13; CAS, SJSC), Swiftcurrent Pass ([2160m]) [Aug.] (6; SJSC), Two Medicine Lake [July] (4; CAS), Weeping Wall [Aug.] (2; DHKa, USNM), Wilbur Creek [July] (5; SJSC); Judith Basin Co., Arrow Creek ([1520m]) [July] (11; DHKa), Drywolf Creek (at

Drywolf Campground [1840m]) [July] (22; DHKa); Lewis and Clark Co., Wolf Creek area [June] (1; UASM); Meagher Co., White Sulphur Springs [Sept.] (3; CAS, CNC); Mineral Co., Lookout Pass ([1280m]) [July] (4; LRus); Missoula Co., Lolo Pass (east side [1580m]) [Aug.] (1; ROM), Seeley Lake (16 mi. w. [1070m]) [July] (2; LRus); Silver Bow Co., Butte (3; ICCM); Sweetgrass Co., Big Timber Creek ([1830m] and at Halfmoon Campground [2230m-2290m]) [July] (150; DHKa); County unknown, Bitterroot Mountains (22; AMNH, CAS, FMNH, KSUC, MCZ, USNM).

OREGON: Baker Co., Anthony Lake ([2130m]) [May-June] (2; FMNH, UWEM), Antone Creek ([1910m-2100m]) [May] (26; DHKa), Baker [June] (1; NMDo), Cornucopia [June-July] (14; BFCa, UWEM), East Fork Eagle Creek [July] (3; UWEM), Pine Creek (10 mi. nw. of Baker [1120m]) [May-July, Sept.] (130; DHKa, FMNH, JSch, MSU, NMDo, ODA, UCD, UCR, UWEM), Spring Creek [July, Sept.] (3; JSch); Union Co., Elgin (and 9 mi. nw. at Little Phillips Creek [1300m]) [May, Aug.] (5; DHKa, UWEM), Langdon Lake area (southeast of summit) [Aug.] (1; UWEM); Wallowa Co., [Aug.] (2; JSch), Imnaha River (at Indian Crossing) [Aug.] (2; MSU, OSUO), Lostline River ([1310m] and at French Campground, Lake Creek Campground, 16 mi. s. of Lostline, Two Pan Campground [1710m-1980m]) [July-Aug.] (84; DHKa, UIMI, USNM, UWEM), Lost Lake [Aug.] (1; DHKa), Wallowa Lake ([1490m-1680m]) [May-Sept.] (110; CAS, DHKa, MSU, NMDo, OSUO, UCR, UIMI, UWEM), Wallowa River [Aug.] (1; UWEM).

WASHINGTON: Columbia Co., Dayton [July] (9; CAS, JSch, WSU); Walla Walla Co., Walla Walla [May, July] (3; UIMI, USNM, UWEM); County unknown, Blue Mountains ([910m]) [July-Aug.] (9; CAS, MCZ, USNM, WSU).

Doubtful Records. CANADA, ALBERTA: Jenner (1; CAS). UNITED STATES OF AMERICA, IDAHO: Twin Falls [June] (1; UIMI). ILLINOIS: Alton

[July] (1; UMMZ). UTAH: Provo Canyon [July] (1; CDA).

Nebria gebleri cascadensis Kavanaugh, NEW SUBSPECIES

Specimens examined: 1690 (944♂, 746♀)

CANADA

BRITISH COLUMBIA: Copper Mountain [Aug.] (4; UCB), Cultus Lake Provincial Park (Entrance Bay Campground) [June] (4; ROM), Garibaldi Provincial Park (Diamond Head Trail [1070m]) [July] (3; CNC), Hope [June-July] (8; BFCa, INHS), Hunter Creek (at Restmore Lodge) [July] (3; CAS), Manning Provincial Park (Blackwell Peak [910m], Nicomen Ridge, Skagit River) [May-Sept.] (34; CAS, CNC, KUSM, MCZ, MSU, RTBe, UBC, UMMZ), Midday Valley (near Merritt) [Aug.] (1; INHS), Nicolum River (at Hope Trail) [July] (2; UBC), North Bend [July] (19; USNM), Skagit River (at Hope Trail [760m]) [July] (3; UBC), Snass Creek (at Warburton Trail [760m]) [July] (5; UBC), Spious Creek [May] (1; CAS), Vancouver (2; ANSP), Whipsaw Creek (at Hope Trail [1220m]) [May, July] (4; UASM, UBC), Vancouver Island, Port Alberni (Robertson Creek Spawning Channel) [June] (1; ROM).

UNITED STATES OF AMERICA

OREGON: Clackamas Co., Austin Hot Springs [July] (1; OSUO), Brightwood (Salmon River) [July] (8; DHKa), Mount Hood (south slope below Timberline Lodge [1190m]) [Aug.] (2; DHKa), Rhododendron ([490m] and 1 mi. se. at Zig Zag River [600m]) [July-Aug.] (55; CAS, DHKa, SJSC, UWBM); Deschutes Co., Elk Lake [July] (1; UWBM), Upper Deschutes River [May] (1; UWBM); Hood River Co., Hood River [May, July] (8; CAS, USNM), Mount Hood (Cloud Cap, Hood River Meadows Ski Area [1710m], Sand Creek,

Tillie Jane Creek, Umbrella Falls) [June-Sept.] (70; CAS, DHKa, MCZ, NMDo, ODA, UCR, UIMI, UWEM); Marion Co., Detroit ([460m] and 5 mi. n.) [July-Aug.] (3; LRus, UWEM); Multnomah Co., Horsetail Falls ([120m]) [May-July] (87; DHKa, JSch, ODA, OSUO). WASHINGTON: (32; ANSP, CAS, INHS, MCZ, OSUC, USNM); Chelan Co., Fish Lake [July] (1; UWEM), Leavenworth [July] (8; ANSP, KUSM, MCZ, SDSU, USNM), Tumwater Canyon ([610m]) [May] (1; LRus); Cowlitz Co., Ariel [May] (1; UWEM), Cougar [Sept.] (2; OSUO), Hoffstadt Creek (at Toutle River) [July] (2; MSU, OSUO), North Fork Toutle River (14 mi. e. of Toutle [300m]) [Aug.] (33; CAS, DHKa), Toutle River [July] (11; UWEM); King Co., Baring [July] (2; FMNH), Green River Gorge (Green River) [May, Aug.] (5; UWEM), Greenwater River (at Greenwater Campground) [June] (1; UWEM), North Bend [July] (17; CAS, CUIC, MCZ), Renton (Cedar River) [May] (1; UWEM), Skykomish [July, Sept.] (2; UASM, UWEM), Snoqualmie [June] (4; UIMI), Stevens Pass (and 4 mi. w.) [June, Aug.] (5; LRus, UASM), Wellington [July] (10; CAS, MCZ, USNM, UWEM), White River (5 mi. w. of Greenwater [1490m], Slippery Creek) [July-Aug.] (42; DHKa, UWEM); Kittitas Co., Blewett Pass (Niger Creek) [July] (2; USNM), Easton (22; CAS, INHS, MCZ, USNM), Snoqualmie Pass [July] (4; CAS), Teanaway Ridge ([910m]) [July] (10; LRus); Klickitat Co., Klickitat Valley [July] (1; MCZ); Lewis Co., Lake Creek (3 mi. ne. of Packwood [370m]) [July] (5; DHKa), White Pass (and 1.5 mi. w. at Millridge Creek [1280m]) [June-July] (42; DHKa, SJSC, USNM); Mount Rainier National Park ([760m-1830m]) [June-Sept.] (30; ANSP, CAS, CUIC, KSUC, MCZ, OSUO, SJSC, UIMI, UWEM), Bear Flat ([1520m-1830m]) [July] (1; CAS), Carbon River [June] (4; UWEM), Cayuse Pass [1400m] [June] (4; USNM), Fish Creek (at West End Road) [June] (1; ROM), Fryingpan Creek ([1160m-1190m]) [July-Aug.]

(38; CNC, DHKa, SJSC), Horse Creek (near Longmire) [July] (15; CAS), Ipsut Creek Campground [Aug.] (1; OSUO), Kautz Creek (at Nisqually River) [Sept.] (2; UWBM), Longmire ([760m]) [June-Aug.] (25; CAS, SJSC, USNM), Narada Falls ([1370m-1460m]) [July-Aug.] (118; DHKa, USNM, UWBM), Nisqually River (0.1 mi. above Paradise River [980m], toe of Nisqually Glacier [1220m-1520m]) [July-Aug.] (7; AMNH, CAS, CUIC, DHKa, MCZ), North Fork Puyallup River (below toe of Puyallup Glacier [1100m-1650m]) [July-Aug.] (22; CNC, DHKa, USNM), Ohanapecosh [June, Aug.] (18; DJLa, LRus, SJSC, UIMI, USNM), Paradise area (below Sluskin Falls, Paradise Park [1220m-1830m], Paradise River [1440m-1680m], Paradise Valley) [June-Sept.] (88; CAS, CUIC, DHKa, FMNH, MCZ, USNM, UWBM), St. Andrews Creek (at West End Road [1160m]) [Aug.] (5; DHKa), Silver Creek [Aug.] (10; UWBM), Sluskin Falls [July] (8; UWBM), Stevens Creek ([1190m-1220m]) [June-July] (4; DHKa, USNM), Sunbeam Falls ([1220m]) [May] (1; CNC), Sunrise area [July] (2; LRus), Tahoma Creek ([910m]) [July] (1; USNM), West End Road [July] (1; CAS), White River ([1190m] and at White River Campground [1520m]) [July-Aug.] (12; FMNH, SJSC, USNM, UWBM), Van Trump Creek (above Christine Falls [1220m-1280m]) [July-Aug.] (62; DHKa, UWBM); Pierce Co., Goat Creek (at Nisqually River [610m]) [July] (130; DHKa), Fairfax [Oct.] (1; FMNH), Poch Creek (at Carbon River) [Aug.] (5; UCB, UWBM), Tenas Creek (5 mi. e. of Ashford [610m]) [July] (1; DHKa), White River (at Silver Springs Campground [790m]) [June, Aug.] (15; DHKa, USNM); Skamania Co., Carson [Aug.] (6; UIMI), Mount St. Helens (Maratta Creek) [July] (3; DHKa), North Fork Cipsus River [June] (14; UWBM), North Fork Toutle River (at Spirit Lake Lodge [940m]) [Aug.] (31; CAS, DHKa), Spirit Lake [July, Sept.] (3; DHKa, UWBM), Stabler [June] (1; OSUO), Wind River

(8 mi. n. of Carson [340m]) [May, July] (14; DHKa); Snohomish Co., Darrington (Clear Creek Falls) [May] (5; UWBM), Glacier Peak [July-Aug.] (2; CAS, UWBM); Whatcom Co., Glacier (North Fork Nooksack River) [July] (13; CAS, LRus), Lookout Creek (4 mi. e. of Glacier [380m]) [Aug.] (18; CAS, DHKa), Mount Baker (Austin Pass [1520m], Bagley Creek [670m], Razor Hone Creek [1680m]) [July-Sept.] (124; CAS, DHKa, LRus, UCR, UWBM), North Fork Nooksack River (4 mi. e. of Glacier [380m], Silver Fir Campground [610m]) [Aug.] (3; CAS, DHKa), Shuksan ([760m]) [Aug.] (3; LRus), Shuksan Creek [Aug.] (12; UWBM), Skagit River (at Newhalem) [July] (2; UWBM); Yakima Co., American River (and at Hell's Crossing [1040m]) [July-Aug.] (17; DHKa, ICCM, KUSM, MCZ, UIMI, UMMZ, UWBM), Bumping River (0.8 mi. sw. of Highway 410 [1010m]) [July-Sept.] (92; CAS, DHKa, ICCM, MCZ, MSU, PURC, UAFA, USNM, WSU), Dog Lake ([1310m]) [July] (25; DHKa), Mount Adams (Bird Creek [910m-2440m], Chaparral Creek [880m], Klickitat River) [June-July, Sept.] (82; AMNH, ANSP, CAS, CUIC, FMNH, ICCM, MCZ, UASM, UIMI, USNM, UWBM, WSU), Naches River [July] (2; USNM), Tampico [July] (1; USNM), Tieton Dam [Aug.] (2; AMNH, WSU), Wildcat Creek (at Tieton River [880m]) [July] (3; DHKa, OSUO), Yakima (11; JSch, MCZ, USNM, WSU), Yakima Indian Reservation ([910m]) [July] (1; CAS).

Doubtful Records. UNITED STATES OF AMERICA, COLORADO: Leavenworth Valley (1; ANSP). WASHINGTON: Pullman (1; ICCM).

No Data. (4; CDA, MCZ, MSU, UWBM).

Nebria gebleri rathwoni LeConte, NEW STATUS

Specimens examined: 954 (524♂, 430♀)

UNITED STATES OF AMERICA

CALIFORNIA: (2; KUSM); Alpine Co., Carson River [Apr.] (3; DJLa, USNM), East Fork Carson River (1.5 mi. se. of Markleeville [1680m]) [July] (6; DHKa), Loope Creek (5.4 mi. se. of Markleeville [1830m]) [July] (45; DHKa), Luther Pass [Aug.] (2; CAS), Markleeville (Markleeville Creek [1680m]) [July] (22; DHKa); El Dorado Co., (5; AMNH, CAS, USNM), Desolation Valley [Aug.] (8; CAS), Fallen Leaf Lake [July] (1; CAS), Kyburz (2 mi. e. on South Fork American River [1340m]) [July] (23; CAS, DHKa), Riverton (3 mi. w. on South Fork American River [910m]) [July] (6; CAS, DHKa), Strawberry Valley ([1830m]) [Aug.-Sept.] (76; ANSP, CAS, KSUC, MCZ, PADA, UMRM, USNM, UWEM), Tallac (5; CAS); Kings Canyon National Park, Bubbs Creek Canyon ([3200m]) [July] (10; CAS, UWEM), Rae Lake ([3200m]) [July] (3; CAS); Lassen Volcanic National Park [July] (1; CAS), Sulphur Works area (West Sulphur Creek [2130m]) [Aug.] (48; CAS, DHKa); Mariposa Co., [July] (2; FMNH); Mono Co., Robinson Creek Trail (above Twin Lakes [2286m]) [Aug.] (9; CAS), Twin Lakes [Aug.] (1; USNM); Nevada Co., [June] (59; ANSP, CAS, DBUM, DHKa, FMNH, MCZ, USNM), Donner Lake (2; CAS), Independence Lake ([2130m]) [Sept.] (4; CAS), Prosser Creek (1 mi. sw. of Hobart Mills [1770m]) [June-July] (10; CAS, CDA, DHKa, UCD), Truckee (Truckee River [1770m]) [July-Aug.] (19; CAS, DHKa, MCZ, USNM); Placer Co., Blackwood Creek [Aug.] (2; CAS), Deer Park Inn (Alpine Meadows Ski Area) [July] (1; UMRM), Tahoe City (3; KUSM, MCZ); Plumas Co., Greenhorn Creek (Highway 70/89 at Massack Rest Area [1140m]) [July] (45; CAS, DHKa), Harrison Flats [Aug.] (1; CDA); Sequoia National Park, Giant Forest ([2290m]) [June] (1; CAS), Marble Fork Kaweah River [Sept.] (1; KSUC), Rattlesnake Creek [Sept.] (2; CAS), Sillman Creek ([2130m]) [Sept.] (3;

CAS); Shasta Co., Hat Creek (Hat Creek [1400m]) [July] (2; CAS, UCD), Old Station (Hat Creek) [Aug.] (2; CAS, DHKa); Sierra Co., Yuba Pass (2 mi. e. on Big Canyon Creek [1830m]) [July] (3; CAS, DHKa); Tulare Co., ([2130m]) [Sept.] (1; OSUC), Franklin Creek ([2500m-2990m]) [July] (96; DHKa), Franklin Lakes ([3050m-3140m]) [July] (4; DHKa), Mineral King [Sept.] (10; CAS, CNC, INHS), Sawtooth ([3050m]) [Sept.] (4; MCZ, UMRM), Tar Gap Trail [Sept.] (5; CAS); Tuolumne Co., Clark Fork Stanislaus River [Aug.] (41; CAS); Yosemite National Park, Dana Fork Tuolumne River (at John Muir Trail [2620m]) [Sept.] (1; DHKa), Illilouette Creek [July] (2; CAS), Merced River [June] (2; CAS); County unknown, Lake Tahoe [May, July] (21; USNM). NEVADA: (3; ANSP, MCZ); Washoe Co., Galena Creek (11 mi. w. of Highway 395 [1920m-2290m]) [July] (66; DHKa, NSDA), Mount Rose ([2440m]) [Aug.] (31; CAS), Third Creek (at Highway 267 [2210m]) [July] (218; DHKa).
No Data. (1; INHS).

Nebria gebleri siskiyouensis Kavanaugh, NEW SUBSPECIES

Specimens examined: 35 (20♂, 15♀)

UNITED STATES OF AMERICA

CALIFORNIA: Trinity Co., Boulder Creek (at Goldfield Campground [1070m]) [July] (2; CAS, DHKa), South Fork Salmon River (at Big Flat Campground [1490m]) [June-July] (30; CAS, DHKa, FMNH), Taylor Lake Road (branch of Taylor Creek [1750m]) [Aug.] (1; CAS). OREGON: Jackson Co., Little Applegate River ([700m]) [Aug.] (2; CAS, FMNH).

Nebria gebleri strawberriensis Kavanaugh, NEW SUBSPECIES

Specimens examined: 29 (22♂, 7♀)

UNITED STATES OF AMERICA

OREGON: Grant Co., Strawberry Creek ([1770m]) [May] (29; DHKa).

Nebria gouleti Kavanaugh, NEW SPECIES

Map: Figure 383

Specimens examined: 516 (228♂, 288♀)

UNITED STATES OF AMERICA

IDAHO: Adams Co., New Meadows ([1170m]) [June] (1; UIMI); Bonner Co., Sandpoint [Sept.] (1; CAS); Clearwater Co., Canyon Ranger Station [Sept.] (1; UIMI); Custer Co., Lower Stanley (10 mi. e. on Salmon River [1800m]) [Aug.] (1; DHKa), Salmon River (at Bayhorse Creek [1620m]) [Aug.] (45; DHKa); Idaho Co., Fenn Ranger Station (Selway Fork Clearwater River) [Aug.] (3; UIMI), Lochsa River (at Canyon Creek [520m]) [July] (2; DHKa), Lowell (39 mi. ne. on Lochsa River [850m]) [July] (1; DHKa), Meadow Creek (1.5 mi. s. of Selway Falls) [Sept.] (1; CAS), Orogrande Creek [Aug.] (3; UWBM), Selway Falls [July] (1; UWBM); Kootenai Co., Coeur d'Alene [June-July] (5; CAS, MCZ, USNM), Hayden [Aug.] (9; AMNH, MCZ, UIMI, USNM); Latah Co., Kendrick [Sept.] (2; UIMI), Moscow (1; USNM); Lemhi Co., Salmon (and 21 mi. n.) [July-Aug.] (2; UASM, UIMI); Nez Perce Co., Lenore [May] (2; UIMI), Lewiston (and 2 mi. e. and 3 mi. e. on Clearwater River [300m-380m]) [May, Aug., Oct.] (52; DHKa, UIMI), Waha [Aug.] (5; CAS, MCZ, PURC, USNM), Waha Lake [July] (4; CAS, MCZ); Shoshone Co., Avery [Sept.] (2; UWBM), Clarkia

[June] (1; UIMI), St. Joe River (17 mi. e. of St. Maries) [July] (10; CAS); Valley Co., Dagger Falls [July] (2; BFCa), Middle Fork Salmon River (near Boundary Creek) [Aug.] (12; RTBe), Zena Creek [June] (1; UIMI); County unknown, Bungalow [Aug.] (15; UWEM). OREGON: Baker Co., East Fork Eagle Creek [July] (2; UWEM), Halfway [July] (1; BFCa); Hood River Co., Hood River [Sept.] (2; MCZ); Multnomah Co., Portland [July] (3; CUIC); Umatilla Co., Cottonwood Creek [June] (3; USNM, UWEM), Kamela [June] (1; CAS), Milton (Walla Walla River) [May-June] (4; UWEM), south of Kooskooskie (Washington) [June] (2; UWEM); Union Co., Elgin (and 0.1 mi. s. at GrandeRonde River [1130m]) [May, Aug.] (2; DHKa), Hilgard Junction State Park [Aug.] (3; RTBe), La Grande (1 mi. ne. on Grande Ronde River [1070m]) [May] (5; DHKa); Wallowa Co., Minam (0.2 mi. se. at junction of Minam River and Wallowa River [790m]) [May] (5; DHKa). WASHINGTON: Asotin Co., Anatone (10 mi. sw. at Rattlesnake Creek [910m]) [Aug.] (21; DHKa), Asotin (Asotin Creek [370m]) [May-June] (18; ANSP, CAS, DHKa), Buford Creek (3.6 mi. s. of Grande Ronde River [760m]) [May] (8; DHKa), Grande Ronde River (at Highway 129 [550m]) [May, Sept.] (2; DHKa, SJSC); Chelan Co., Leavenworth [July] (20; ANSP, CAS, MCZ, PURC, USNM, UWEM), Peshastin Creek [July] (1; UASM), Tumwater Canyon ([610m]) [May] (2; LRus); Columbia Co., Dayton (Touchet River [580m]) [May, July] (5; DHKa, WSU); Franklin Co., Palouse Falls State Park [May] (2; LRus); Klickitat Co., Trout Lake [July] (1; UWEM), White Salmon [Aug.] (2; UWEM); Skamania Co., Underwood (15 mi. w. on Columbia River [90m]) [May] (4; DHKa); Spokane Co., Spokane Falls (1; CAS); Walla Walla Co., Burbank [May] (1; ANSP), Coppei [May] (1; UAFA), Coppei Creek [May] (1; UIMI), Kooskooskie [June, Aug.] (3; UIMI, UWEM), Touchet River (near Waitsburg)

[July] (8; DJLa), Walla Walla (and 2 mi. s. [320m], Mill Creek) [May-Sept.] (139; CAS, CUIC, DHKa, MCZ, OSUO, PURC, UIMI, UMMZ, UWBM, WSU); Whitman Co., Almota [May] (2; MCZ, MSU), Wawawai (2.8 mi. nw. at Snake River [300m]) [May] (11; DHKa), Wilma [Apr.-May] (6; ANSP, UWBM).

Doubtful Records. CANADA, ALBERTA: Longview (Highwood River) [July] (7; CAS). UNITED STATES OF AMERICA, CALIFORNIA: (2; USNM).

Nebria gregaria Fischer

Map: Figure 393

Specimens examined: 2406 (1115♂, 1291♀)

UNITED STATES OF AMERICA

ALASKA: (60; AMNH, CAS, DHKa, INHS, KSUC, KUSM, MCZ, OSUC, UMMZ, UMRM, USNM); Aleutian Islands (1614; CAS, DHKa, KSUC, MCZ, MSU, USNM), Adak Island (Adak, Mount Moffett) [July-Sept.] (9; INHS, MCZ, MSU), Akutan Island [Aug.] (1; CAS), Amlia Island [Aug.] (2; CAS, USNM), Atka Island (Nazan Bay area) [July-Aug.] (37; CAS, USNM), Attu Island (Peaceful River) [July] (1; MCZ), Kiska Island [June, Oct.] (9; CUIC, USNM, UWBM), Little Kiska Island [June] (16; USNM, UWBM), Semisopochnoi Island [July] (2; USNM, UWBM), Unalaska Island (Captains Bay, Dutch Harbor [0m-30m], Makushin Bay [0m-460m], Mount Makushin, Unalaska and 3 to 6 mi. s.) [June-Sept.] (607; ALar, ANSP, CAS, CNC, CUIC, DBUM, DHKa, FMNH, ICCM, KUSM, MCZ, PADA, UASM, USNM, UWBM).

Doubtful Records. CANADA, "ALBERTA/BRITISH COLUMBIA": (1; ICCM).

UNITED STATES OF AMERICA, ALASKA: Juneau [July] (1; FMNH), Nome (7; CAS), Pilot Cove [May, July] (6; ICCM, KUSM, WSU), Sitka (3; ICCM,

INHS), White Pass [July] (8; LACM), Wrangell Island (Wrangell) [June] (3; ICCM). OREGON: (4; CAS, UMRM, USNM).

No Data. (14; ANSP, INHS, MCZ, UMMZ, USNM).

Nebria gyllenhali Schönherr

Map: Figure 388

Nebria gyllenhali castanipes Kirby

Specimens examined: 4499 (2344♂, 2155♀)

CANADA

ALBERTA: Banff National Park, Banff [May-Aug.] (102; BFCa, CAS, CUIC, DHKa, MCZ, UASM, USNM), Bow River (and 1 mi. s. of Banff) [July, Sept.] (7; DHKa, RTBe), Eisenhower Junction ([1430m]) [July] (1; CNC), Lake Louise [July] (1; AMNH), Lake Minnewanka [Aug.-Sept.] (5; DJLa, UASM), Vermillion Lakes [Aug.] (1; CAS); Jasper National Park [July] (1; AMNH), Astoria River ([1770m]) [Aug.] (1; DJLa), Jasper [Aug.] (15; CNC, MCZ), Medicine Lake (on trail to Beaver Lake) [Aug.] (2; RTBe), Miette River (at Meadow Creek [1100m]) [July-Aug.] (39; DHKa, UASM), Mount Edith Cavell [Sept.] (1; DHKa), Sunwapta Pass [Aug.] (1; RTBe), Two Jack Lake [July] (1; USNM); Waterton Lakes National Park [May, July-Aug.] (36; BFCa, CNC, DJLa, UASM); Other localities, Aldersyde area [July] (1; BFCa), Athabasca (4; UASM), Athabasca River (at Calling Lake, 3 mi. ne. of Chain Lakes) [June, Sept.] (8; UASM), Beaver Creek [July] (10; UASM), Beaverdam Lake [May] (1; DJLa), Big Hill Springs Provincial Park [July] (8; ROM), Bilby [Apr., June-July] (8; CAS), Blackstone Gap [Aug.] (4; CAS, CNC), Blakiston Brook [July] (14; UASM), Calgary [May-June, Aug.]

(7; BFCa, DJLa, MCZ), Calling Lake (w. of Campbell's Beach [590m])
 [June, Sept.] (89; DHKa, DRWh, UASM), Calling River (near Calling Lake)
 [June] (2; UASM), Cammore [June] (1; BFCa), Cline River (at Highway 11)
 [July-Aug.] (7; BFCa, DHKa), Crowsnest area (Crowsnest Lake and 1 mi.
 w.) [July-Aug.] (21; CNC, UASM, UWEM), Devon (6 mi. sw. at Conjuring
 Creek [700m]) [June] (3; DHKa), Edmonton (McKinnon Ravine, North
 Saskatchewan River at Emily Murphy Park and at Goat Bridge [670m])
 [Apr.-Oct.] (243; CAS, CNC, DHKa, DJLa, DRWh, KUSM, MCZ, PURC, RFre,
 RTBe, UASM, UCD, UMMZ, USNM), Elk Creek area [Aug.] (1; BFCa), Entrance
 (34 mi. wnw. at Collie Creek [1460m], 40 mi. nw. at North Fork Wildhay
 River [1430m-1460m]) (10; DHKa, UASM), Error Lake area [July] (2; BFCa),
 Exshaw [Oct.] (1; BFCa), Fawcett [June] (2; UASM), Foggy Mountain
 [July] (21; DHKa, UASM), Fort Fitzgerald [Sept.] (1; CAS), Fort Macleod
 [Aug.] (1; USNM), Fort McMurray [June, Aug.] (15; CAS, CNC), Fox Creek
 (11 mi. sse. on Highway 43) [June] (2; UASM), Gap [Aug.] (2; CAS),
 Freeman Lake (10 mi. s. of Swan Hills) [Aug.] (18; HGou), George Lake
 ([700m]) [June] (39; DHKa, DJLa), Gold Creek (2 mi. w. of Bellevue
 [1370m]) [July] (1; DHKa), Goose Mountain ([1400m]) [Aug.] (16; HGou),
 Gorge Creek [June-July] (3; UASM), Grande Prairie [June] (3; BFCa),
 Hailstone Butte area [Aug.] (1; BFCa), Happy Valley [May, Aug.] (4;
 UASM), Hay River (near Highway 35) [July] (1; UASM), High River [May]
 (3; CAS), Highwood River [May] (1; BFCa), Hummingbird Creek area [July]
 (2; BFCa), Kootenay Plains [June] (2; RFre), Lake Wabamun (near
 Sundance) [June, Aug.-Sept.] (20; UASM, USNM), Lundbreck [July-Aug.]
 (3; LEMC, MCZ, UASM), Lusk Creek (near Kananaskis Forest Experiment
 Station) [July] (1; CNC), Mercoal [July] (1; UASM), Morse River (near
 Fort Assiniboine) [July] (1; UASM), Nojack (Cold Creek) [Sept.] (1;

RFre), Nordegg (and 20 mi. s. on Forestry Trunk Road, South Creek Bridge) [July] (102; DHKa, UASM), North Saskatchewan River (27 mi. sw. of Nordegg) [June] (3; USNM), Notikewin Campground [July] (1; UASM), Peace River [Aug.] (5; UASM), Pembina River (w. of Flatbush) [June] (4; UASM), Pincher Creek (and 11 mi. s.) [July-Aug.] (9; UASM), Prairie Bluff Mountain [July] (1; UASM), R. B. Miller Station (Gorge Creek) [Aug.] (11; DHKa), St. Albert (Sturgeon River) [June] (1; UASM), Sheep River (4.5 mi. above Gorge Creek) [Aug.] (1; DHKa), Smoky River [June] (6; JVMA), South James River area [Aug.] (1; BFCa), Spring Creek Basin [June] (46; UASM), Sundance [July] (1; UASM), Ware Creek (5 mi. nw. of R. B. Miller Station) [Aug.] (60; DHKa), West Branch Castle River ([1340m]) [Aug.] (6; DJLa), Willow Creek [Aug.] (7; CAS). BRITISH COLUMBIA: (1; AMNH); Kootenay National Park, Simpson River [Aug.] (2; CNC, UASM); Yoho National Park, Field [July] (1; USNM); Other localities, Atbara [May, July-Sept.] (27; CNC, CUIC, UASM, UBC), Atlin ([1460m]) [July] (1; CNC), Blanchard River (Haines Highway mi. 93) [June] (9; CNC, UASM), Blue River (18 mi. n.) [June] (1; BFCa), Bowron Lake Provincial Park (Bowron Lake) [Aug.] (5; UBC), Buchley River (near Houston) [June] (4; UASM), Castlegar [June] (1; GRNo), Chilcotin [Apr.-May] (7; CAS, UBC), Chilkat Pass ([1070m]) [July] (7; CNC, UASM), Cinema (Cottonwood Creek) [June] (1; UASM), Contact Creek (Alaska Highway mi. 588.1) [Aug.] (4; DHKa), Copper Mountain [May] (1; UBC), Cottonwood [July] (4; CNC), Creston [May, July-Sept.] (15; CNC, MSU, UASM, UBC), Crowsnest Pass (2 mi. [1280m] and 5 mi. [1220m] w.) [July] (4; DHKa), Dutch Creek (at Windermere Road) [Aug.] (1; UBC), Endako (20 mi. w.) [June] (1; UASM), Fernie [Aug.] (1; CAS), Fort Nelson [Aug.] (1; UASM), Fort St. John [Aug.] (3; UBC), Fraser Lake (east end)

[June] (10; UASM), Glenora (10; ANSP, CAS, MCZ, USNM), Hat Creek [Aug.] (1; UBC), Hope Pass (summit [1830m]) [July] (1; UBC), Island Pond (35 mi. n. of Kimberley) [Aug.] (1; UASM), Kamloops [Sept.] (1; CAS), Le Moray [July] (1; BFCa), Liard River (Alaska Highway mi. 491, at Trout River) [June] (4; CNC, UASM), Lorna [June] (3; CAS, INHS, UBC), MacDonald River (Alaska Highway mi. 413 [1370m]) [July] (1; CNC), Manning Provincial Park (Pasayten River at park entrance) [May] (3; CNC, UASM), Mara Lake [Aug.] (1; BFCa), Michel [July-Aug.] (9; UASM), Midday Valley (Midday Creek) [June-Aug.] (10; CAS, CNC, INHS, UBC), Minnie Lake [July] (5; CNC), Moberly Lake [July] (2; BFCa), Muskwa River (Alaska Highway mi. 296) [June] (8; CNC, UASM), Parsnip River (8 mi. n. of McLeod Lake) [June] (13; CNC, UASM), Pavilion [June] (25; CNC, UASM), Peace River (at Alaska Highway, at Pine River) [June] (5; UASM, UBC), Pine Pass (Hart Highway) [Aug.] (3; UBC), Pouce Coupe [July] (1; BFCa), Prince George [Aug.] (2; UBC), Princeton [July] (2; BFCa, UBC), Quesnel [Sept.] (2; KUSM), Racing River (Alaska Highway mi. 418) [June] (1; CNC), Radium [June] (1; BFCa), Rock Creek [July] (12; CAS, MSU, UBC, UMMZ), St. Mary Lake [Aug.] (5; UASM), Salmon Valley [July] (1; BFCa), Skeena River (near Terrace) [June] (1; CNC), Sikhanni Chief River (Alaska Highway mi. 160) [June] (4; UASM), Spillimacheen [Aug.] (1; UBC), Stanley [July] (1; UBC), Summit Lake (Alaska Highway mi. 392 [1280m-1370m]) [June-July] (9; CNC, UASM), Swan Lake [June] (1; UBC), Terrace (7 mi. e.) [June] (1; CNC), Tetsa River (Alaska Highway mi. 376 and 378) [Aug.] (11; DHKa, LRus), Toad River (2; JVMa), Upper Elk River [June] (1; BFCa), Wardner (Kootenay River) [Sept.] (1; UBC), Whipsaw Creek (at Hope Trail [1220m]) [May, July] (5; MCZ, UASM, UBC), Whirlpool Canyon (Alaska Highway mi. 538.5 at Liard River) [July] (1; CNC).

MANITOBA: [July] (2; CAS, UASM); Riding Mountain National Park [June] (1; CNC); Other localities, Cedar Lake [July] (1; MCZ). NEWFOUNDLAND: Island of Newfoundland, Bay of Islands [July] (4; AMNH, CAS, DHKa), Hampden [July] (2; UWEM), Humber River (near Deer Lake) [July] (5; MCZ, USNM), Little Codroy River [July] (10; MCZ, USNM), Nicholsville [July] (8; MCZ), St. Anthony [June-Aug.] (94; BMNH, CNC, CPQC, CUIC, JSch, MCZ, UASM), St. George's Bay [July] (1; AMNH), South Branch (Grand Codroy River) [July] (2; MCZ), Spruce Brook [Aug.] (7; AMNH, CUIC, MCZ, USNM); Labrador, Barge Bay [July] (1; UWEM), Battle Harbour [June-Aug.] (26; AMNH, CAS, CNC, CUIC, DHKa, MCZ, USNM), Blanc Sablon (4; ANSP), Brig Harbour Island (Harrison Inlet) [Aug.] (1; USNM), Cabot Lake (1; CNC), Chateau Bay [July] (1; CAS), Forteau [July] (17; CNC), Hawke Harbour [Aug.] (2; MCZ), Hebron [July] (2; CNC), Henley Harbour [July] (9; CNC, UWEM), Inlet Bay [July] (1; CNC), L'Anse au Loup [July] (8; CNC), Nutak [July] (1; CNC), Pinware River [July] (5; CNC), Red Bay [July] (25; AMNH, ANSP, CNC, CUIC), Voiseys Bay (3; CNC), West St. Modeste [July] (86; AMNH, CAS, CNC, CUIC, DHKa, MCZ, PADA, UMMZ, USNM, UWEM); Location unknown, Cape Charles (Labrador) (1; CAS). NORTHWEST TERRITORIES: District of Mackenzie, Fort Simpson [June] (3; CNC), Fort Smith (and Slave River, 26 mi. w.) [June-Aug.] (37; CNC, CUIC, UASM, USNM), Great Slave Lake (at Hay River) [Aug.] (5; USNM), Kakisa River [June] (6; DHKa), Lady Evelyn Falls [Aug.] (17; USNM), Norman Wells [June-July] (2; CNC), Pointed Mountain [June] (1; JVMA), Providence [July] (1; CAS). ONTARIO: Algoma District, Michipicoten River [Aug.] (3; ANSP, USNM); Cochrane District, Ogoki [July] (9; CNC); Kenora District, Fort Severn [July] (4; ROM); Thunder Bay District, Lake Superior (4; MCZ), Michipicoten Island [July] (10; ANSP, USNM), Nipigon [June-July] (16;

CAS, CNC, ICCM, MCZ), Rossport Provincial Park (McLean Creek) [June] (5; ROM), Terrace Bay (and 16 mi. e.) [June-July] (2; CNC, ROM); Location unknown, Shriver's Bay [Aug.] (2; RTBe). QUÉBEC: [Aug.] (1; DBUM); Cté d'Abitibi, Joutel [June] (10; ALar, CNC, DBUM), Lac Chicobi [July] (11; ALar, CNC), Matagami [June] (26; ALar, CNC, DBUM), Rapide-des-Cèdres [July] (2; ALar), Senneterre [July] (5; ALar, CNC), Val-d'Or [July] (10; ALar, CNC, DBUM); Cté de Bonaventure, Cascapédia [Aug.] (6; CNC), Escuminac [July-Aug.] (8; ALar); Cté de Charlevoix-Est, Baie Ste-Catherine [June] (121; ALar, CNC, DBUM); Cté de Chicoutimi, St-Ambroise [June] (5; ALar); Cté de Gaspé-Ouest, Parc de La Gaspésie (Mont Albert northeast slope [480m], summit [910m-1070m], Ruisseau du Diable [980m-1070m]) [June-Aug.] (147; ALar, CNC, CUIC, DBUM, DHKa), Rivière-à-Claude ([60m]) [July] (1; CNC), Rivière-la-Madeleine [July] (3; ALar); Cté de Lac-St-Jean-Ouest, Cheverry [June] (2; ALar), Dolbeau [June] (16; ALar), Mistassini [June] (6; ALar); Cté de Montmorency No 1, Parc des Laurentides (Lac Jacques-Cartier [790m]) [July] (32; ALar, CDA, CUIC, JSch, LRus, NMDo); Cté de Saguenay, Aguanish [June] (2; ALar), Île d'Anticosti (Ellis Bay, Fox Bay, Pointe de l'Est, Port-Menier, Rivière Jupiter) [June-July] (17; ALar, CPQC, MCZ), Blanc Sablon [July] (2; ALar), Bradore Bay [July-Aug.] (25; ALar, CNC, MCZ), Chute-aux-Outardes [June-July] (10; ALar, CPQC, DBUM), Forestville [June] (1; ALar), Godbout [Aug.] (1; ROM), Grandes-Bergeronnes [June-July] (89; ALar, CNC, DBUM, RTBe, UASM), Harrington (Harrington Harbor) [July] (9; ALar, CNC), Île aux Perroquets [July] (3; MCZ), Lourdes-de-Blanc-Sablon [July] (2; ALar), Magpie [June] (1; ALar), Middle Bay [July] (3; ALar, CPQC), Natashquan [July] (1; CNC), Sept-Îles [July] (1; ALar), Tadoussac [June] (3; ALar, CPQC); Territoire de Mistassini Lac Albanel [June-Sept.]

(24; DBUM), Lac Mistassini [July] (29; DBUM), Rupert House [=Fort Rupert] [June-July] (24; ALar, CNC), Rupert River (85 mi. e. of Rupert House) [July] (2; CNC), Territoire du Nouveau-Québec, Fort-Chimo [Aug.] (3; CNC), Fort George [July] (9; ALar, DBUM), Inoucdjouac [July] (22; ALar, DBUM), James Bay (east coast) [Nov.] (1; CAS), La Guillaume-Delisle [=Richmond Gulf] [Aug.] (1; MCZ), Port-Nouveau-Québec [=George River] [July-Aug.] (6; PURC, UASM), Poste-de-la-Baleine [=Great Whale River] [June-July] (21; ALar, CNC, DBUM), Povungnituk [July] (8; ALar, DBUM), Rivière Koroc [July] (1; DBUM), Schefferville [July] (2; ALar).

SASKATCHEWAN: Meota [July] (1; USNM). YUKON TERRITORY: Big Creek (Alaska Highway mi. 674) [Aug.] (1; DHKa), Little Salmon Lake [Aug.] (1; CNC), Logjam Creek (Alaska Highway mi. 751.1) [Aug.] (2; DHKa), Lower Rancheria River (Alaska Highway mi. 687.1) [Aug.] (2; DHKa), Mason Creek [Aug.] (2; CNC), Thikanni River [June] (1; CNC), Upper Liard River (Alaska Highway mi. 642.6) [June] (1; UASM), Whitehorse [Aug.] (1; CNC), Yukon River (at Alaska Highway) [Aug.] (1; DHKa).

UNITED STATES OF AMERICA

ALASKA: Circle [July] (5; MCZ, UASM), Holy Cross (3 mi. nw. on Yukon River) [July] (2; USNM), Wrangell Island (Wrangell) (1; MCZ), Marshal (Yukon River) [Aug.] (6; USNM), Russian Mission (Yukon River) [Aug.] (2; USNM), Yukon River (between Holy Cross and Paimuit, between Marshal and Old Andreanofski) [July, Sept.] (6; USNM). IDAHO: Blaine Co., Alturas Lake (at Inlet Campground [2130m]) [July-Aug.] (5; DHKa, UWBM), Cherry Creek (0.1 mi. nw. of Highway 93 [2230m]) [Aug.] (3; DHKa), Hyndman Creek [July] (9; UWBM), North Fork Warm Springs Creek (10 mi. w. of Ketchum [1890m]) [Aug.] (2; DHKa), Petit Lake [July] (5; BFCa);

Camas Co., Carrie Creek (33 mi. [2440m] and 36 mi. [2100m] ese. of Ketchum) [Aug.] (2; DHKa), South Fork Boise River (34 mi. e. of Featherville at Bear Creek [1830m]) [Aug.] (12; DHKa); Custer Co., Bayhorse Creek (7 mi. nw. of Highway 93 [2440m]) [Aug.] (1; DHKa), Bayhorse Lake ([2590m]) [Aug.] (28; DHKa), Fourth of July Creek (3 mi. e. of Highway 93 [2230m]) [Aug.] (7; DHKa), Hellroaring Creek (at Salmon River [1620m]) [Aug.] (2; DHKa), Rothas (8 mi. nne. at Pass Creek [1980m]) [Aug.] (4; DHKa), Salmon River (at Bayhorse Creek [1620m]) [Aug.] (13; DHKa), Summit Creek (2 mi. ne. of Trail Creek Summit [2320m]) [Aug.] (7; DHKa), Wet Creek (2 mi. wsw. of Pass Creek Pass [2410m]) [Aug.] (16; DHKa); Kootenai Co., Coeur d'Alene [June] (11; ANSP, MCZ, USNM, UWEM), Coeur d'Alene Lake [July] (3; CAS); Shoshone Co., Clarkia [June] (1; UIMI), Enaville [July] (3; CAS), St. Joe River (17 mi. e. of St. Maries) [July] (1; CAS); Valley Co., Middle Fork Salmon River (near Boundary Creek) [Aug.] (1; RTBe); County unknown, Beaver Canyon [July] (1; USNM), Twin Creek Forest Camp ([1520m]) [July] (16; UWEM). MAINE: Piscataquis Co., Baxter State Park (Mount Katahdin [300m-1520m], at Chimney Pond [910m], top of Saddle Slide [1220m], summit area [1600m]) [June-Aug.] (72; ICCM, MCZ, USNM). MICHIGAN: Chippewa Co., Whitefish Point [July] (1; UMMZ); Isle Royale National Park, Isle Royale [July] (4; UMMZ, USNM). MINNESOTA: St. Louis Co., Duluth [Aug.] (2; ICCM). MONTANA: Beaverhead Co., Big Hole River (at Highway 91 [1550m]) [Sept.] (1; UASM); Blaine Co., Bear Paw Mountains [Sept.] (4; USNM); Carbon Co., East Rosebud Lake [June] (4; CUB), Rock Creek (at Red Lodge [1680m]) [July] (33; DHKa); Cascade Co., Jefferson Creek (2 mi. e. of Highway 89 [1870m]) [July] (5; DHKa); Chouteau Co., North Fork Highwood Creek (at Briggs Creek [1370m]) [July] (1; DHKa),

South Fork Highwood Creek (at Big Coulee [1490m]) [July] (7; DHKa); Fergus Co., Crystal Lake ([1870m]) [July] (36; DHKa), East Fork Rock Creek ([1710m]) [July] (13; DHKa); Flathead Co., Kalispell [June] (7; CAS, MCZ, USNM); Gallatin Co., Bozeman area (and Sourdough Canyon) [June-July] (3; DZEC, UWBM), Fairy Lakes [Aug.] (3; CUIC), Windy Pass [July] (1; CUIC); Glacier Co., St. Mary River [Aug.] (16; CAS); Glacier National Park [June-July] (7; CUIC), Grinnell Glacier ([1920m]) [Aug.] (1; SJSC), Swiftcurrent Creek (at Many Glacier [1480m]) [July-Aug.] (2; SJSC); Judith Basin Co., Arrow Creek ([1520m]) [July] (2; DHKa), Dry Wolf Creek (at Dry Wolf Campground [1840m]) [July] (21; DHKa); Lake Co., Arlee ([820m]) [July] (2; LRus); Lewis and Clark Co., Helena area [July-Aug.] (2; MCZ, USNM); Mineral Co., Alberton ([910m]) [Aug.] (1; LRus); Ravalli Co., Sula [July] (1; CAS); Silver Bow Co., Pipestone Pass ([1830m]) (1; LRus); County unknown, East Flathead ([1740m]) [July] (1; DZEC). NEVADA: Elko Co., Lamoille Creek (at Lower Lamoille Campground [1920m]) [Aug.] (86; DHKa), Thomas Creek (at Thomas Creek Campground [2320m]) [Aug.] (31; DHKa). NEW HAMPSHIRE: (41; ANSP, CAS, DEUN, DHKa, FMNH, ICCM, INHS, MCZ, PMNH, PSUC, RTBe, SDSU, UMRM, USNM); Coos Co., Ammonoosuc River (and at Fabyaus, [July] (3; ANSP, MCZ, UMMZ), Mount Adams [July] (2; AMNH), Mount Jefferson [July] (2; AMNH, PMCh), Mount Washington ([910m-1920m], Ammonoosuc River, Bigelow Lawn [1650m], Great Gulf, Hermit Lake, Lake of the Clouds [1520m], summit [1890m-1920m], Tuckerman Ravine) [May-Sept.] (630; ALar, AMNH, ANSP, CAS, CNC, CUIC, DBUM, DHKa, DEUN, FMNH, ICCM, INHS, KSUC, KUSM, LEMC, MCZ, MSU, NMDo, PADA, PMCh, RDav, RTBe, SJSC, UASM, UMMZ, USNM, WSU); Grafton Co., Franconia area (4; CAS, MCZ). NEW YORK: (2; CAS, MCZ); Essex Co., Mount Haystack [Aug.] (3; RTBe), Mount Marcy (Lake Tear, Plateau Camp,

Range Trail, summit) [June-Aug.] (97; AMNH, CUIC, DHKa, MCZ, RTBe).

OREGON: (1; INHS); Baker Co., Pine Creek [June] (3; UWBM); Union Co., Highway 204 (between Elgin and Tollgate) [June] (1; UWBM); Wallowa Co., Chief Joseph Mountain [Aug.] (2; MCZ), Lost Lake [Aug.] (1; DHKa), Lostine River (French Campground, Lake Creek Campground, above Two Pan Campground [1710m-1980m]) [Aug.] (68; DHKa, UWBM), Wallowa Lake (at inlet of Wallowa River [1940m]) [May-June, Aug.] (80; CAS, DHKa, JSch, MSU, OSUO, PURC, UCR, UWBM). SOUTH DAKOTA: Lawrence Co., East Fork Spearfish Creek (2.2 mi. se. of Cheyenne Crossing [1830m]) [July] (7; DHKa). WASHINGTON: Ferry Co., Keller (Sanpoil River) [July] (19; AMNH, CAS, ICCM, MCZ, USNM, UWBM); Okanogan Co., Tonasket (2 mi. e.) [June] (8; FMNH, UWBM); Yakima Co., (2; JSch, WSU), American River [July-Aug.] (4; UIMI, USNM, UWBM), Bumping River [Aug.] (7; ANSP, PURC, USNM, UWBM, WSU), Soda Springs Campground (at Bumping Lake Road) [May] (1; JSch), Tampico [July] (1; USNM), Yakima area (1; USNM). WISCONSIN: Bayfield Co., Bayfield (1; UWBM). WYOMING: Albany Co., Middle Crow Creek (2 mi. se. of Hidden Valley Picnic Area [2590m]) [July] (1; DHKa); Big Horn Co., Granite Creek (8 mi. sw. of Granite Pass [2380m]) [July] (12; DHKa), Meadowlark Lake ([2560m]) [Aug.] (16; FMNH, UWBM), Shell Creek (11 mi. sw. of Granite Pass [2130m]) [July] (2; DHKa), West Tensleep Creek ([2830m-3200m], 1 mi. n. of Tyrell Ranger Station [2560m]) [July] (40; DHKa), West Tensleep Lake ([2770m]) [July] (2; DHKa); Converse Co., La Prele Creek (at Camel Creek Campground [2530m]) [July] (61; DHKa); Grand Teton National Park, Colter Bay Campground [July] (11; CUIC), Emma Matilda Lake [July] (7; MCZ); Johnson Co., Clear Creek (5 mi. w. of Buffalo [1650m], 12 mi. w. of Buffalo [2190m]) [July] (30; DHKa), Powder River Pass [Aug.] (2; MSU), South Fork Clear

Creek (16 mi. w. of Buffalo [2350m]) [July] (6; DHKa); Park Co., Beartooth Plateau [Aug.] (3; DHKa, SJSC); Sheridan Co., Little Tongue River (13 mi. wsw. of Dayton [2380m]) [July] (74; DHKa); Sublette Co., Boulder Creek (15 mi. ne. of Boulder [2260m]) [July] (5; DHKa), Hoback River (8 mi. nw. of Bondurant [2100m], 14 mi. sw. of Highway 187/189 [2440m]) [July-Aug.] (8; DHKa), Pine Creek (at Pinedale [2180m]) [July] (24; DHKa); Teton Co., Blackrock Creek (3.7 mi. wnw. of Togwotee Pass [2770m]) [Aug.] (1; DHKa), Granite Creek (at Little Granite Creek [2150m]) [Aug.] (46; DHKa), Gros Ventre River (at Highway 89/187) [Aug.] (2; EAMa, USNM); Washakie Co., West Tensleep Creek (at East Tensleep Creek [2350m]) [July] (3; DHKa); Yellowstone National Park [July] (7; USNM); County unknown, "Bighorn Reserve" (1; MCZ), Medicine Bow Mountains [Aug.] (1; USNM).

Doubtful Records. CANADA, BRITISH COLUMBIA: Campbell River [July] (1; CAS). UNITED STATES OF AMERICA, ARIZONA: (2; AMNH, USNM). CALIFORNIA: (2; ICCM, MCZ). MASSACHUSETTS: (3; AMNH, MCZ); Middlesex Co., Sherborn (3; UMMZ). MISSOURI: (1; MCZ).

No Data. (2; CDA, MCZ).

Nebria gyllenhali lassenensis Kavanaugh, NEW SUBSPECIES

Specimens examined: 36 (19♂, 17♀)

UNITED STATES OF AMERICA

CALIFORNIA: Lassen Volcanic National Park, Emerald Lake ([2450m]) [Aug., Oct.] (6; CAS, DHKa, FMNH), Little Hot Springs Area (East Sulphur Creek [2440m-2530m]) [Aug.] (6; CAS, DHKa), Mount Lassen (3 mi. se.) [July] (1; USNM), Ridge Lake [Aug.] (16; CAS); Tuolumne Co., Sonora Pass

[Aug.] (3; CAS). OREGON: Deschutes Co., Todd Lake (and 1 mi. s.)

[Aug.] (4; JSch).

Nebria gyllenhali lindrothi Kavanaugh, NEW SUBSPECIES

Specimens examined: 1393 (706♂, 687♀)

UNITED STATES OF AMERICA

COLORADO: (2; KUSM, PURC); Boulder Co., ([3810m]) [July] (1; CUB), Arapaho Pass ([2740m-3350m]) [Aug.] (1; RTBe), Arapahoe Peak ([3510m]) [Aug.] (3; CArm), Beaver Creek ([2530m]) [July] (1; CArm), Fourth of July Mines ([3430m]) [Aug.] (2; CArm), Jenny Lake ([3200m]) [July] (2; CArm), Middle St. Vrain Creek ([3600m]) [July] (1; CArm), Niwot Ridge ([3050m]) [July] (5; CArm, CUB), Rainbow Lakes ([3350m]) [Aug.] (3; CNC), Rollins Pass ([3410m-3540m]) [Aug.] (2; CUB, DHKa), South Fork Middle Boulder Creek ([2900m-3960m]) [Aug.] (1; CArm); Clear Creek Co., Leavenworth Valley (Argentine Road [3660m-3960m]) (2; USNM), Loveland Pass ([3660m-3840m]) [July] (42; CAS, RTBe, UWM), Mount Evans ([3600m-4330m], and Summit Lake [3900m-3960m]) [July-Aug.] (76; CAS, CNC, DHKa, FMNH, MCZ, PURC, RCGr, UASM); Conejos Co., Cumbres Pass ([3050m]) [June] (1; CAS); Custer Co., Ophir Creek (7.3 mi. sw. of Fairview [3140m]) [June] (9; DHKa), St. Charles River (1.9 mi. sw. of San Isabel [2710m-2830m]) [June] (14; DHKa), Wet Mountains ([3470m]) [July] (2; USNM); Dolores Co., Lizard Head Pass ([3050m]) [Sept.] (1; CAS), Rico area ([2590m-3050m]) [July] (10; ANSP, MCZ, USNM); El Paso Co., Pikes Peak ([3960m]) [July] (8; AMNH, CAS), South Cheyenne Creek (at Gold Camp Road [2530m-2650m]) [June] (1; DHKa); Garfield Co., Trappers Lake ([2990m]) [Aug.] (49; DHKa); Gilpin Co., Central City ([2620m]) [July]

(1; CAS), Corona ([3350m]) [Sept.] (7; CAS, CUIC), South Boulder Creek (at Rollinsville and 2.5 mi. w. [2440m]) [July-Aug.] (5; CARM, DHKa, UAFA); Grand Co., Ptarmigan Peak (20; MCZ, ZMLS); Gunnison Co., Gothic ([2930m]) [July] (2; USNM), Mexican Cut Lakes (1 mi. nw. of Elko Park [3440m]) [Aug.] (1; PMNH); Huerfano Co., Apishapa Pass [June] (3; CUB), Bear Lake [June] (13; DHKa, EAMa), Blue Lake [June] (10; DHKa, EAMa), Cucharas Pass ([3050m] and 1.5 mi. n.) [June] (109; DHKa, EAMa), Cucharas River (near Blue Lake [3190m]) [June] (5; DHKa); Jackson Co., Cameron Pass ([3140m]) [Aug.] (1; UASM), Rabbit Ears Pass ([2740m]) [June-Aug.] (8; CAS, USNM); La Plata Co., Hermosa Creek Trail (nw. of Hermosa [2960m]) [Aug.] (9; UASM); Larimer Co., Browns Lake Trail [Aug.] (9; RTBe), Crown Point [July] (21; RTBe), Zimmerman Lake [Aug.] (3; RTBe); Los Animas Co., Apishapa Pass (2.1 mi. se. [3230m]) [June] (9; DHKa), Bear Creek (5 mi. s. of Cucharas Pass [2800m]) [June] (83; DHKa); Mesa Co., [Aug.] (5; PMCh, RDav), Grand Mesa ([3050m]) [July-Aug.] (6; CAS, CUB, USNM), Skyway ([3050m]) [June] (2; DHKa, FMNH); Mineral Co., Pagosa Springs (20 mi. n.) [June] (1; DRWh), Wolf Creek Pass ([3250m-3660m] and 2 mi. w.) [June-Aug.] (49; CAS, CNC, DHKa, EAMa, USNM); Ouray Co., American Flats ([3660m]) [July] (4; AMNH), Ouray area [June-July] (4; AMNH, CAS); Park Co., Middle Fork South Platte River (near Hoosier Pass [3540m]) [July] (1; DHKa), Mount Lincoln ([3350m]) [Aug.] (1; UASM); Rio Grande Co., Rio Grande River (1 mi. s. of South Fork [2400m]) [Aug.] (29; DHKa, EAMa), Summitville ([3050m-3350m]) [Aug.] (7; CNC, MCZ); Rocky Mountain National Park ([3200m-3510m]) [June-Aug.] (11; CAS, CNC, UASM), Fall River Pass ([3600m]) [July] (5; CUB), Longs Peak ([3840m] and at Chasm Lake [3810m]) [July-Aug.] (14; CARM), Milner Pass ([3280m]) [July] (1; AMNH), Ouzel Falls

([3050m]) [Aug.] (1; CARM), Sandbeach Lake ([3050m]) [June] (7; CARM),
 Trail Ridge Road ([3660m-3690m]) [Aug.] (2; CUB, USNM); Routt Co.,
 Buffalo Pass (Summit Lake [3140m]) (4; CAS), Walton Creek (above Dumont
 Lake [2900m-2960m]) [Aug.] (5; DHKa); San Juan Co., Silverton ([3660m])
 [July] (1; USNM); Summit Co., Quandary Peak (south slope [3410m-3960m])
 [Aug.] (35; DHKa); Teller Co., ([3410m]) [June] (1; PADA), Phantom
 Canyon ([2960m]) [June] (1; CAS); County unknown, "Hot Springs" (1;
 ICCM), King's Lake ([3350m]) [Aug.] (2; CARM), La Plata Mountains
 ([3200m-3660m]) [July-Aug.] (4; DHKa, USNM), "Laramie Co." (2; ICCM),
 Medicine Bow Range ([2440m-3660m]) [July] (3; MCZ), Mount Baldy (summit
 [3750m]) [July] (1; CARM), San Juan Mountains ([3660m]) [July] (1;
 USNM), "foothills of Rocky Mts." (1; PMNH). NEW MEXICO: (9; ANSP, ICCM,
 KUSM, MCZ, USNM); Rio Arriba Co., Gregorio Lake ([2790m]) [June] (5;
 DHKa), Rio Puerco (at Rio Puerco Campground [2350m-2440m]) [June] (3;
 DHKa); Santa Fe Co., Lake Katherine ([3600m]) [June] (30; DHKa), Nambe
 Divide ([3350m]) [July] (2; ANSP); San Miguel Co., Beaver Creek (sw. of
 Rincon Montoso [2620m]) [Aug.] (15; UASM), Crowles area ([2440m]) [June]
 (1; UASM), Las Vegas area ([2130m]) [July] (1; KUSM), Willow Creek
 (near Torrero [2740m]) [June] (8; UASM); Taos Co., Red River (2.2 mi.
 [2610m] and 4.1 mi. [2580m] w. of Red River, 8 mi. s. of Red River
 [2870m]) [June] (38; DHKa), Tres Ritos [July] (4; CAS), Wheeler Peak
 ([3050m-3640m], Middle Fork Lake [3340m], Middle Fork Red River [3260m-
 3690m]) [June] (153; DHKa). UTAH: Grand Co., Mill Creek (at Oowah Lake
 [2680m]) [Aug.] (12; DHKa); San Juan Co. ([2800m]) [Aug.] (1; FMNH),
 Geyser Pass (at Blue Lake) [Aug.] (2; AMNH), Mill Creek Valley ([2900m])
 [Aug.] (2; UASM). WYOMING: Albany Co., Brooklyn Lake ([3200m]) [July]
 (41; DHKa), Centennial area ([3050m]) [Aug.] (22; MSU, SDSU), Douglas

Creek (1 mi. sse. of Keystone [2680m]) [July] (32; DHKa), Little Brooklyn Lake ([3120m]) [July] (113; DHKa), Medicine Bow Peak ([3350m-3660m]) [July-Aug.] (3; FMNH, KSUC, UWL), Mirror Lake ([3290m]) [July] (37; USNM), Nash Fork Little Laramie River (7.5 mi. nw. of Centennial [2990m]) [July] (1; DHKa), Snowy Range Pass ([3200m]) [June, Aug.] (33; RTBe, UASM); Carbon Co., Elk Mountain (35.0 mi. ne. of Saratoga [3400m]) [July] (32; USNM), Hidden Treasure Gulch (11.5 mi. wsw. of Encampment [2870m]) [July] (2; DHKa), Lake Marie ([3230m] and 8 mi. sw. [2740m]) [July] (7; DHKa), North French Creek (4 mi. w. of Mirror Lake [3050m]) [July] (3; DHKa), Silver Lake ([3170m]) [July] (32; USNM).
Doubtful Records. UNITED STATES OF AMERICA, MASSACHUSETTS: (1; UMRM).

Nebria hudsonica LeConte

Map: Figure 384

Specimens examined: 2937 (1614♂, 1323♀)

CANADA

ALBERTA: [July-Aug.] (10; BFCa): Banff National Park, Banff (and 1 mi. s. on Bow River) [June-Oct.] (160; ANSP, CAS, CUIC, DHKa, ICCM, MCZ, UASM, USNM), Cascade Creek [Sept.] (6; DJLa, USNM, UWBm), Lake Louise [July] (2; AMNH), Lake Minnewanka [Aug.] (5; UASM), North Saskatchewan River (at Highway 93) [July] (1; DHKa); Jasper National Park, Amethyst Lakes Trail [Aug.] (2; DHKa), Jasper [Aug.] (6; CNC), Maligne Lake [July] (1; CUIC), Medicine Lake [July] (4; CUIC), Miette River (at Meadow Creek) [July-Aug.] (45; DHKa, UASM), Portal Creek ([1190m]) [Aug.] (1; DJLa), Pyramid Lake [Aug.-Sept.] (2; RTBe); Waterton Lakes National Park, Waterton Park (Cameron Creek) [July] (18; CAS, CNC,

UASM); Other localities, Beaver Creek [Aug.] (3; UASM), Bellevue (2 mi. w. at Gold Creek [1370m]) [July] (8; DHKa), Blackstone Gap [Aug.] (8; CAS, CNC), Caroline (30 mi. w. at Elk Creek Campground) [Aug.] (1; MSU), Chain Lakes (3 mi. ne. at Athabasca River) [Sept.] (8; UASM), Cline River (at Highway 11) [Aug.] (4; DHKa), Crow's Nest Pass ([1340m-1360m] and Crow's Nest Lake) [July] (12; CNC, DHKa, UASM), Daisy Creek [Aug.] (11; CAS), Devon (0.2 mi. n. on North Saskatchewan River [700m]) [June] (8; DHKa), Edmonton (North Saskatchewan River) [May-Aug.] (17; CNC, DHKa, RTBe, UASM, USNM), Elbow Falls [July] (1; DRWh), Entrance (20 mi. nnw. at Wildhay River [1310m], 30 mi. wnw. at Wildhay River [1220m], 34 mi. wnw. at Collie Creek [1460m], 40 mi. wnw. at North Fork Wildhay River [1430m]) [June] (26; DHKa, UASM), Forestry Trunk Road (at North Saskatchewan River) [June] (1; DRWh), Fort Fitzgerald [Aug.] (1; UASM), Fort Macleod [Aug.] (3; UASM, USNM), Fort McMurray [June-July] (6; UASM), Fort Vermillion Ferry (Peace River) [July] (3; UASM), Freeman Lake (10 mi. s. of Swan Hills) [Aug.] (3; HGou), Gap [Aug.] (7; CAS, CNC), Gorge Creek [June-Aug.] (32; UASM, USNM), Grande Cache Road (at Athabasca River [1100m]) [June] (3; DHKa), Happy Valley [Aug.] (1; UASM), High River [July] (4; CAS, MCZ), Highwood River [Aug.] (2; CAS), Kananaskis Valley (Kananaskis Forest Experiment Station) [Aug.] (1; CNC), Kinuso (24 mi. n.) [Aug.] (1; UASM), Kootenay Plains [June] (1; RFre), Lethbridge [May, Sept.] (4; CNC, DJLa), Little Smoky (1 mi. w. at House Creek) [Aug.] (1; LRus), Longview (Highwood River) [July] (5; CAS), Lundbreck [July-Aug.] (12; CAS, LEMC, MCZ, UASM, UBC), Medicine Hat [May-Sept.] (104; ALar, AMNH, ANSP, CAS, CUIC, DBUM, KUSM, MCZ, MSU, OSUC, UASM, UCD, UMMZ, USNM), Nordegg (and 27 mi. sw.) [June-July] (19; UASM, USNM), Peace River [Aug.] (1; UASM), Pincher Creek [Aug.] (9; CNC,

UASM), Rocky Mountain House (North Saskatchewan River) [July] (3; UASM), Sheep River (4.5 mi. above Gorge Creek) [Aug.] (21; DHKa), Spray Lakes [July] (3; JVMA), Spring Creek Basin (Simonette River) [June] (5; UASM), Ware Creek (5 mi. nw. of R. B. Miller Research Station) [Aug.] (80; DHKa), West Branch Castle River ([1340m-1400m]) [July-Aug.] (12; DJLa), Willow Creek [Aug.] (1; CAS); Location unknown, Waterloo [July] (1; PURC). BRITISH COLUMBIA: [July, Sept.] (9; AMNH, FMNH, INHS, MCZ, NMDo); Kootenay National Park, Simpson River [Aug.] (10; CNC, UASM), Vermillion Creek [July] (1; CAS); Mount Revelstoke National Park [July] (8; CAS, UCB); Yoho National Park, Field [July-Aug.] (3; USNM); Other localities, Atbara [Aug.-Sept.] (7; CUIC, UASM, UBC), Atlin ([670m]) [Aug.] (1; CNC), Atlin Lake [July] (1; CUIC), Big Boulder Creek (east of Pine Pass) [June] (9; CNC, UASM), Big Creek (Alaska Highway mi. 674) [Aug.] (12; DHKa), Blanchard River (Haines Highway mi. 93) [June] (5; UASM), Blind Bay [Oct.] (1; CAS), Boswell [Aug.] (21; UASM), Bowron Lake Provincial Park (Bowron Lake) [July] (1; BFCa), Buckinghorse River (at Alaska Highway) [July] (1; USNM), Bull River [Sept.] (1; UBC), Canim Lake [July] (1; BFCa), Christina Lake [May] (2; CNC, UASM), Contact Creek (Alaska Highway mi. 588.1) [Aug.] (11; DHKa), Creston (and 2 mi. w. at Kootenay River) [May, Aug.] (20; DHKa, UASM, UBC), Crow's Nest Pass (2 mi. w. at Elk Creek [1280m], 5 mi. w. at Elk River [1220m]) [June-July] (28; BFCa, DHKa), Edgewood [Aug.] (15; CAS, DBUM, KUSM), Elk Creek (e. of Fernie) [July] (6; UASM), Fernie (and 10.7 mi. w. on Elk River) [June-July] (38; CAS, CNC, FMNH, INHS, MSU, ROM, UWBM), Flathead [June] (1; CUIC), Fort Steele [Sept.] (1; UBC), Glenora (2; ANSP, USNM), Golden (9 mi. e. at Kicking Horse River [1160m]) [Aug.] (4; DHKa), Goodrich Creek (12 mi. w. of Little Prairie) [July] (5;

CNC, UASM), Greenwood [Aug.] (17; UASM), Hosmer (Elk River) [July]
 (4; CAS), Hyland River (Alaska Highway mi. 605) [Aug.] (4; DHKa), Iron
 Creek (Alaska Highway mi. 594.3) [Aug.] (5; DHKa), Kamloops [Sept.]
 (1; UBC), Keremeos (9 mi. w.) [June] (1; CNC), Kicking Horse Camp
 [July] (2; CAS), Kingsgate (Moyie River) [July, Oct.] (9; DJLa, UBC),
 Kimberley (17 mi. n. at Kootenay River) [Aug.] (14; UASM), Kuskonook
 [Sept.] (1; CUIC), Lake Windermere [Sept.] (2; CAS), Mable Lake [May,
 Aug.] (7; CAS, CNC), Marguerite [June] (2; CNC, UASM), Michel (and at
 Cabin Creek) [July-Aug.] (16; CNC, UASM), Midway (and 4 mi. w.) [June-
 July] (2; BFCa, CNC), Moberly Lake [July] (1; BFCa), Morrissey [July]
 (21; UWBM), Mount Robson Provincial Park (Robson, Robson Creek) [May-
 June, Sept.] (27; CNC, JVMA, RTBe, UWBM), Muncho Lake Provincial Park
 (Alaska Highway mi. 459) [July] (6; BFCa), Muskwa River (Alaska High-
 way mi. 296) [June] (4; CNC, UASM), Nation River [June] (8; DBUM, FMNH,
 PURC), Oliver (and 7 mi. n.) [May-June] (18; CNC, UASM), "115" Creek
 (Alaska Highway mi. 403.4) [Aug.] (1; DHKa), Peace River (at Alaska
 Highway) [June] (1; UBC), Penticton (and at Dog Lake, Skaha Lake) [Aug.-
 Sept.] (42; CAS, CNC, DHKa), Perow (McEvoy Creek) [June] (7; UASM),
 Princeton [May, July] (6; UBC, CNC), Prophet River (Alaska Highway mi.
 233) [Aug.] (2; CNC, UASM), Quesnel [July] (2; UBC, UWBM), Quesnel
 Lake [Sept.] (3; CAS, KUJSM), Racing River (Alaska Highway mi. 418.7)
 [June-July] (3; CNC, UASM), Revelstoke [July-Aug.] (2; BFCa, MCZ),
 Riondel [Aug.] (6; CAS, CNC), Rock Creek [May] (1; CNC), Salmon Arm
 [July] (3; CAS), Sheep Creek [June] (1; CAS), Shusway Falls [June] (1;
 CAS), Sikhanni Chief River (Alaska Highway mi. 160) [June] (10; CNC,
 UASM), Skookumchuk [Aug.] (6; UBC), Smithers (13 mi. n. at Trout Creek)
 [June] (3; UASM), Sugar Lake [July, Sept.] (3; CAS, CNC), Summit Lake

(Alaska Highway mi. 329.5 [1280m]) [June-July] (6; CNC, UASM), Swift River (Alaska Highway mi. 733.3) [June] (3; UASM), Tetsa River (Alaska Highway mi. 376 to 390) [June, Aug.] (11; CNC, LRus, MSU, UASM), Toad River (Alaska Highway mi. 422 [1370m] to 437.5) [Aug.] (9; CNC, DHKa, JvMa), Upper Collier Lake [July] (1; UWBM), Upper Liard River (Alaska Highway mi. 642.6) [June] (3; UASM), Vaseaux Lake [May] (1; CNC), Vernon [Aug.] (1; CAS), West Bank [June] (4; CAS). MANITOBA: Cedar Lake [July] (1; MCZ). ONTARIO: Thunder Bay (McIntyre River) [July] (2; JKus). SASKATCHEWAN: (1; MCZ); Saskatoon (South Saskatchewan River) [Sept.] (1; UASM). NORTHWEST TERRITORIES: District of Mackenzie, Fort Smith (Slave River) [June-Aug.] (35; CNC, CUIC, UASM, USNM). YUKON TERRITORY: Little Rancheria River (Alaska Highway mi. 670.2) [Aug.] (8; DHKa), Lower Rancheria River (Alaska Highway mi. 687.1) [Aug.] (9; DHKa), Morley River (Alaska Highway mi. 777) [Aug.] (7; DHKa), Nisutlin Bay (Alaska Highway mi. 803.4) [June] (1; UASM), Rancheria (Swift River) [Aug.] (28; CNC, UASM), Seagull Creek (Alaska Highway mi. 733) [Aug.] (2; DHKa), Swift River (Alaska Highway mi. 725.1 to 733) [June, Aug.] (28; CNC, DHKa, LRus), Upper Rancheria River (Alaska Highway mi. 721.6) [Aug.] (3; DHKa), Watson Lake [Aug.] (2; CNC), Whitehorse [June] (1; CUIC); Location unknown, Rock Creek [May] (1; CNC).

UNITED STATES OF AMERICA

COLORADO: (2; ANSP, INHS); Boulder Co., Boulder Creek (at junction with Fourmile Creek [1770m]) [Aug.] (1; DHKa), Eldora (South Fork Middle Boulder Creek [2530m-2900m]) [July-Aug.] (26; CArm), Lefthand Creek (near Boulder [1980m-2190m]) [July] (4; CArm), Middle St. Vrain

Creek ([2650m-2990m]) [July] (27; CArm, CUB), Nederland (Middle Boulder Creek in Boulder Canyon) [June] (1; CArm), Pinecliffe (and 3 mi. w. on South Boulder Creek [2380m-2440m]) [June-Aug.] (49; CArm, DHKa), Raymond (Middle St. Vrain Creek [2350m]) [Aug.] (2; CArm), South Boulder Creek (above El Dorado Springs [1980m-2100m], near Gross Dam [2130m]) [July] (24; CArm), South St. Vrain Creek ([2350m]) [July] (4; CArm), Ward ([2500m] and 5 mi. e. on Lefthand Creek [2440m]) [July-Aug.] (174; CArm, DHKa, USNM); Clear Creek Co., Empire (Clear Creek) [Sept.] (1; LRus), Graymont (Clear Creek [2740m]) [July] (3; DHKa), Idaho Springs ([2290m]) [July] (6; CAS), Leavenworth Valley ([2740m-3050m]) [June] (14; CAS, CNC, CUIC, MCZ, ROM, USNM, UWEM), Silver Plume ([2740m-3050m]) [June] (37; CAS, CUIC, FMNH, MCZ, UCR, USNM, UWEM); Garfield Co., New Castle (Colorado River) [Aug.] (2; USNM); Gilpin Co., East Portal (South Boulder Creek [2740m]) [July] (7; CArm, CUB), Rollinsville ([2440m-2530m] and 2.5 mi. w. on South Boulder Creek) [July-Aug.] (67; CArm, DHKa, UAFA); Grand Co., Berthoud Pass ([3050m]) [July] (3; CAS); Gunnison Co., Gothic ([2900m]) [July] (1; SJSC); Jefferson Co., Golden (Clear Creek [1680m]) [June] (2; EAMa, USNM); Lake Co., Independence Pass (5.1 mi. e.) [Aug.] (12; UAFA), Leadville [June] (9; CAS), Twin Lakes (and 4 mi. w., 7 mi. w., 12 mi. w. on Lake Creek [3200m]) [June, Aug.] (45; CAS, DHKa, EAMa); Larimer Co., Cameron Pass [June, Aug.] (3; EMUS, RTBe, UASM); Park Co., Santa Maria (North Fork South Platte River [2440m]) [June] (9; DHKa); Pitkin Co., Aspen (and 8 mi. e. on Roaring Fork River [2800m]) [July-Aug.] (18; AMNH, DHKa, UWEM); Rocky Mountain National Park, Ouzel Falls ([3050m]) [July-Aug.] (12; CArm, DHKa), Wild Basin (North St. Vrain Creek [2710m]) [July] (3; DHKa); Summit Co., Blue River (3 mi. s. of

Breckenridge) [July] (5; RTBe). IDAHO: Bear Lake Co., Montpelier Canyon [Sept.] (12; CAS); Bonner Co., Hope [Aug.] (6; MSU, OSUC), Pend Oreille Lake (near Sandpoint) [Oct.] (19; DHKa, UASM), Priest Lake [July, Sept.] (23; CAS, UIMI), Sandpoint [June, Aug.] (18; CNC, JSch, NMDo); Kootenai Co., Coeur d'Alene [June] (4; CAS, DEUN, UMMZ, USNM), Hayden Lake [Aug.-Sept.] (24; CAS, MCZ, UIMI, USNM); Madison Co., Green Canyon Hot Springs [July] (8; UWEM); County unknown, Beaver Canyon [July] (7; USNM). MONTANA: (2; UMMZ); Beaverhead Co., Big Hole River (at Highway 91 [1550m]) [Sept.] (5; UASM); Carbon Co., Bridger (Clark's Fork Yellowstone River) [Sept.] (1; DHKa), East Rosebud Lake [June-Aug.] (18; CUB, DHKa, USNM), Quad Creek (17 mi. sw. Red Lodge [3050m]) [July] (2; DHKa), Red Lodge (Rock Creek [1680m]) [July] (4; DHKa); Cascade Co., Belt (Little Belt Creek [1100m]) [July] (5; DHKa), Dry Fork Belt Creek (at Henn Gulch [1620m]) [July] (3; DHKa), Monarch (and 1 mi. s. on Belt Creek [1400m]) [July-Aug.] (30; BFCa, DHKa); Fergus Co., East Fork Rock Creek ([1710m]) [July] (44; DHKa); Flathead Co., Flathead Lake [Sept.] (1; MSU), Hungry Horse ([1220m]) [July] (18; LRus), Kalispell [June] (14; CAS, FMNH, KSUC, MCZ, ROM, UASM, USNM); Gallatin Co., Bozeman ([1430m]) [Aug.] (4; LRus), Gallatin [June] (3; NMDo), Squaw Creek [Sept.] (1; UIMI); Glacier Co., Babb (4.5 mi. n. at Kennedy Creek [1400m]) [July] (2; DHKa), St. Mary [Aug.] (2; MSU), St. Mary River [Aug.] (19; CAS); Glacier National Park, Baring Creek [Aug.] (4; UWEM), Fish Creek Camp [Aug.] (5; OSUO), Going-to-the-Sun Chalet [Aug.] (44; UWEM), Lake McDonald [Aug.] (10; UWEM), Kintla Lake [June] (4; CAS), St. Mary Lake [Aug.] (2; CAS), St. Mary River [July-Aug.] (24; CAS, CUIC, FMNH), Sprague Creek Campground (at Lake McDonald) [Aug.] (7; RTBe), West Glacier (Flathead River) [Aug.] (5; SJSC);

Lincoln Co., Troy (Kootenai River [550m]) [July] (20; CAS, CUIC, LRus); Madison Co., Beaver Creek ([1920m]) [Aug.] (1; KUSM); Mineral Co., Alberton ([910m]) [Aug.] (5; LRus), St. Regis [Sept.] (1; FMNH); Missoula Co., Lolo Pass (2 mi. e. on Lolo Creek [1520m]) [July] (1; DHKa), Missoula [Aug.] (1; DZEC); Park Co., Emigrant [Aug.] (10; BFCa); Powell Co., Elliston ([1370m]) [July] (2; LRus); Ravalli Co., Como Lake [July] (1; FMNH), Grantsdale [Aug.] (3; BFCa), Ross Hole [Aug.] (3; USNM); Sanders Co., St. Regis (12 mi. ne. [760m]) [June] (1; LRus); Yellowstone Co., Yellowstone River (near Laurel at Highway 310) [Sept.] (3; DHKa, UASM). OREGON: Hood River Co., Hood River [May, Sept.] (5; MCZ). UTAH: Uintah Co., Big Brush Creek (7 mi. wnw. of Highway 44 [2620m]) [Aug.] (48; DHKa). WASHINGTON: (12; ANSP, INHS, KSUC, MCZ, UMRM, USNM); Benton Co., Hanford [May] (2; UWBM), Kennewick [Sept.] (1; UWBM), Richland [May] (2; UWBM), White Bluffs [June] (1; WSU); Chelan Co., Lake Chelan [May] (1; UAFA), Manson [May] (1; UWBM), Stehekin [July] (3; UWBM), Wenatchee [May] (5; UWBM); Douglas Co., Moses Coulee Creek [May] (1; UWBM); Franklin Co., Pasco [May] (14; MCZ, UWBM); Kittitas Co., Cle Elum [May] (3; UWBM), Ellensburg [June, Sept.] (84; CAS, FMNH, UWBM), Thorp [May] (19; LRus, UWBM), Vantage [May] (1; UWBM); Spokane Co., Spokane (and at Spokane Falls) [July] (6; CAS, USNM, WSU); Yakima Co., Toppenish [June] (1; UWBM). WYOMING: Albany Co., Centennial ([2440m] and 0.5 mi. e. on North Fork Little Laramie River [2440m], 2.0 mi. nw. on Libby Creek [2620m]) [July-Aug.] (36; DHKa, MSU), Keystone (1 mi. sse. at Douglas Creek [2680m]) [July] (1; DHKa), Woods Landing (Laramie River [2290m]) [July] (16; DHKa); Grand Teton National Park [June] (2; CAS), Colter Bay Camp [July] (1; CUIC), Jenny Lake [June-July] (16; FMNH, SJSC); Laramie Co., Cheyenne [May] (1; ICCM); Lincoln Co., Alpine

Junction (15 mi. se. on Greys River at Murphy Creek [1920m]) [July] (5; DHKa), Hoback Junction (16 mi. sw. on Snake River at Wolf Creek [1770m-1780m]) [July-Aug.] (26; DHKa); Park Co., Cody [July] (4; ANSP, MCZ), Crazy Creek (at Crazy Creek Campground [2120m]) [Aug.] (12; DHKa); Sublette Co., Battle Mountain (0.5 mi. s.) [Aug.] (1; EAMa), Bondurant (8 mi. nw. on Hoback River [2100m]) [July-Aug.] (93; DHKa), Boulder (15 mi. ne. on Boulder Creek [2260m]) [July] (12; DHKa), Green River Lakes (west shore [2440m-2590m]) [July] (12; DHKa), Pinedale (39 mi. nnw. on Green River at Whiskey Grove Campground [2320m]) [July] (36; DHKa); Teton Co., Granite Creek (at junction with Little Granite Creek [2150m]) [Aug.] (4; DHKa), Jackson (9.8 mi. s. on Snake River [1830m]) [Aug.] (40; DHKa); Yellowstone National Park [July-Aug.] (19; CAS, USNM).

Doubtful Records. UNITED STATES OF AMERICA, CALIFORNIA: (2; ANSP, UMRM).

No Data. (5; ANSP, MCZ, UASM, USNM).

Nebria ingens Horn

Map: Figure 408

Nebria ingens ingens Horn

Specimens examined: 123 (32♂, 91♀)

UNITED STATES OF AMERICA

CALIFORNIA: Fresno Co., Mt. Darwin ([4150m]) [Aug.] (1; CAS); Inyo Co., Big Pine Creek (above Finger Lake [3440m]) [Aug.] (1; CAS), George Creek ([3440m]) [July] (1; CAS), Jigsaw Pass (east side [3350m]) [Sept.] (1; CDA), Mt. Agassiz (east slope [3720m]) [Aug.] (1; CAS),

Mt. Whitney (Lone Pine Creek [3270m-3760m]) [July] (112; DHKa, UASM, USNM); Tulare Co., Franklin Lakes [July, Sept.] (4; CAS, FMNH), Mt. Whitney [Aug.] (1; SFVS).

Nebria ingens riversi Van Dyke, NEW STATUS

Specimens examined: 9 (2♂, 7♀)

UNITED STATES OF AMERICA

CALIFORNIA: Mono Co., Mill Creek (northeast slope of Mt. Conness [3300m]) [Aug.] (1; CAS), White Mtn. (cirque on northeast slope [3350m]) [July] (2; DHKa); Yosemite National Park, Mt. Lyell (north slope [3350m-3450m]) [July] (6; CAS, CDA).

Nebria kincaidi Schwartz

Map: Figure 405

Nebria kincaidi kincaidi Schwartz

Specimens examined: 245 (155♂, 90♀)

CANADA

BRITISH COLUMBIA: Inverness [July] (2; CAS, USNM), Metlakatla (1; CUI), Mount Hayes (near Prince Rupert [610m]) [June] (10; CNC), Telegraph Point (Kwinitsa) [June] (3; CNC, UASM), Thornhill Mountain (near Terrace [1070m-1520m]) [July] (3; CNC, MCZ), Tyee (2.6 mi. nw.) [June] (14; CNC, UASM); Vancouver Island, Forbidden Plateau (Mount Becher [910m-1370m]) [Aug.] (10; MCZ, UBC, UWBM), Mount Arrowsmith Trail ([300m-980m]) [Aug.] (3; UASM).

UNITED STATES OF AMERICA

ALASKA: Farragut Bay [June] (1; USNM). WASHINGTON: Mason Co., Lake Cushman [July] (1; UMMZ); Olympic National Park [Aug.] (23; AMNH, CAS, MCZ, UASM, USNM), Boulder Peak ([1520m]) [Aug.] (1; CNC), Hurricane Ridge [July] (16; UWBm), Mount Steel [July] (4; MSU, UMMZ), Olympic Hot Springs (Boulder Creek [670m-760m]) [May-Aug.] (149; CAS, CNC, DHKa, JSch, MCZ, UIMI, UWBm), Seven Lakes Basin [Aug.] (1; USNM), Sol Duc Hot Springs [July] (2; OSUO, UWBm), Soleduck River ([490m-760m]) [Aug.] (1; LRus); County unknown, Stillaguamish River [June] (1; UWBm).

Doubtful Records. CANADA, ALBERTA: Mount Edith Cavell [July-Aug.] (1; ROM).

Nebria kincaidi balli Kavanaugh, NEW SUBSPECIES

Specimens examined: 360 (187♂, 173♀)

UNITED STATES OF AMERICA

OREGON: Hood River Co., Mount Hood ([910m-1830m] and Cloud Cap Road at TillieJane Road, Hood River Meadows Ski Area [1620m-1710m], Tillie Jane Creek [1830m], Umbrella Falls) [June-Sept.] (62; AMNH, CAS, CUIC, DHKa, MCZ, MSU, ODA, USNM, UWBm, WSU). WASHINGTON: Mount Rainier National Park [July-Sept.] (4; CUIC, SJSC, WSU), Cayuse Pass ([1400m]) [June] (1; USNM), Fryingpan Creek ([1160m-1190m]) [July-Aug.] (2; CNC, DHKa), Louise Lake [July] (5; UASM), Mowich Lake [July] (4; OSUO, UWBm), Mystic Lake [July] (1; WSU), Nisqually River ([1220m]) [May] (4; CNC), Paradise area (Narada Falls [1520m], Paradise Park [1520m-1830m], Paradise River [1460m-1830m]) [June-Aug.] (255; CAS, CNC, CUIC, DHKa, FMNH, KUSM, LRus, MCZ, OSUO, UASM, USNM, UWBm), Ricksecker Point [Sept.]

(1; UWEM), Sluskin Falls [July] (1; UWEM), Snow Lake ([1520m]) [Aug.] (1; CNC), Spray Park ([1980m]) [Aug.] (1; LRus), Sunrise area [July] (2; CAS, LRus), Van Trump Creek (above Christine Falls [1220m-1280m]) [July] (7; DHKa), Van Trump Park ([1830m]) [Aug.] (1; CNC), West Drive [July] (1; CAS); Pierce Co., Coplay Lake [May] (1; UWEM); Skamania Co., Spirit Lake [910m-1770m] [Aug.] (1; OSUO).

Doubtful Records. UNITED STATES OF AMERICA, OREGON: Deschutes Co., Bend [July] (8; LACM).

Nebria lacustris Casey

Map: Figure 384

Nebria lacustris lacustris Casey

Specimens examined: 2276 (1196♂, 1080♀)

CANADA

MANITOBA: Winnipeg [June] (1; CUIC). ONTARIO: (1; CNC); Elgin Co., New Sarum (e. of St. Thomas) [June] (3; CNC), Port Stanley [Sept.] (3; UASM); Essex Co., North Bay (1; ROM); Halton Co., Burlington [June, Sept.-Oct.] (4; DMad), Zimmerman [May-June] (53; DMad); Huron Co., Grand Bay [June] (1; CNC); Middlesex Co., Fanshawe Lake (near London) [Aug.] (8; UASM), Lobo Township [Aug.] (7; UASM); Norfolk Co., Delhi (w. of Simcoe) [June] (1; CNC), Normandale [June] (7; CNC), Turkey Point [Aug.] (1; UAFA); Oxford Co., Drumbo [Sept.] (1; RTBe); Peterborough Co., Peterborough [Sept.] (1; UAFA); Simcoe Co., Bondhead (16 mi. w.) [Sept.] (3; UASM); York Co., Toronto [May-Sept.] (18; CUIC, ROM, USNM). QUÉBEC: Cté d'Arthabaska, St-Louis-de-Blandford [Aug.] (1; ALar);

Cté de Beauharnois, Beauharnois [Sept.] (5; ALar, DBUM); Cté de Brome, Knowlton (and 5 mi. se.) [July-Aug.] (2; CNC, UASM); Cté de Charlevoix-Est, Baie Ste-Catherine [June] (3; ALar), La Malbaie [July] (1; ALar), Port-au-Persil [June-July] (29; ALar, CNC, DBUM), Port-au-Saumon [June-July] (103; ALar, CNC, DBUM, DHKa), St-Fidèle [July-Aug.] (9; ALar), St-Siméon [June-Aug.] (24; ALar, CNC, DBUM); Cté de Charlevoix-Ouest, Île-aux-Coudres [June-Aug.] (16; ALar, CNC, USNM); Cté de Frontenac, Lac-Mégantic [Aug.] (1; CPQC); Cté de Levis, St-Étienne [Sept.] (1; LRus); Cté de Lotbinière, St-Sylvestre [Aug.] (1; ALar); Cté de Portneuf, Ste-Catherine [Aug.] (1; ALar); Cté de Saguenay, Chute-aux-Outardes [June-July] (9; ALar, DBUM), Grandes-Bergeronnes [June] (1; ALar), Tadoussac [June, Aug.] (2; ALar, LEMC); Île-de-Montreal, Île Ste-Hélène [June, Aug.] (7; CPQC, DJLa), Montréal (1; CNC); County unknown, Chanon (1; CAS).

UNITED STATES OF AMERICA

CONNECTICUT: (1; AMNH). DISTRICT OF COLUMBIA: Washington (and Rock Creek Park) [May, Sept.-Oct.] (7; MCZ, USNM). ILLINOIS: (4; RTBe); Champaign Co., Urbana (1; ICCM); Kankakee Co., Momence [July] (2; UWEM); Ogle Co., Grand Detour [June] (3; FMNH); Vermillion Co., Grape Creek (1 mi. n.) [May] (2; RTBe), Kickapoo State Park [May, Sept.-Oct.] (8; RTBe), Muncie (3 mi. s.) [Nov.] (1; RTBe). INDIANA: Fountain Co., [May] (3; LRus); Lawrence Co., Spring Mill State Park [Oct.] (1; RTBe); Marion Co., Indianapolis [May] (1; PURC); Montgomery Co., Shades State Park [May, Sept.] (5; PURC, RTBe); Parke Co., [Oct.] (2; NMDo), Annapolis (Devil's Den) [July] (1; DHKa), Turkey Run State Park [June, Sept.] (14; DHKa, FMNH, UCD); Putnam Co., Greencastle [Sept.] (8; LRus);

Tippecanoe Co., [May-Oct.] (11; JSch, NMDo, UMMZ), Lafayette (and 1 mi. ne., 8 mi. w., Wabash River) [May, Aug.-Oct.] (25; GRNo, PURC, UMMZ, USNM), Wildcat Creek (4 mi. e. of Lafayette [200m]) [May] (12; DHKa); Vigo Co., (2; PURC). IOWA: (2; UMMZ); Buchanan Co., Independence (3; CAS, USNM, UWEM). KENTUCKY: Jackson Co., [May] (2; MCZ); Powell Co., Slade [June] (2; MCZ). MAINE: Aroostook Co., Allagash area [Aug.] (8; MCZ); Oxford Co., Bethel [Sept.] (2; MCZ). MARYLAND: Allegany Co., Difficult Creek [June] (3; MCZ); Baltimore Co., North Point [May] (1; USNM); Calvert Co., Calvert Beach [May] (1; JSch), Plum Beach [May] (1; JSch); Frederick Co., Buckeystown [Aug.] (1; RTBe); Montgomery Co., [Nov.] (1; USNM), Cabin John [Sept.-Oct.] (4; USNM), Plummers Island [Mar.-May, Sept.-Nov.] (18; CAS, USNM); Washington Co., Harpers Ferry [May] (1; USNM). MASSACHUSETTS: (9; AMNH, MCZ, USNM); Franklin Co., Mount Toby [Sept.] (1; MCZ); Hampshire Co., Amherst [Oct.] (2; JSch), Cummington [July] (1; USNM); Middlesex Co., Framingham [June] (2; USNM). MINNESOTA: [Sept.] (8; INHS, JSch, WSU); Ramsey Co., St. Paul (1; INHS). NEW HAMPSHIRE: (7; ANSP, CAS, DHKa, FMNH, MCZ, RTBe); Belknap Co., Lake Winnepesaukee (and Three Mile Island) [June] (2; MCZ); Carroll Co., East Wakefield (1; MCZ), Mount Chocorua [June] (4; MCZ); Coos Co., Carter Notch ([1070m]) [June] (1; ANSP), Errol (Atkinson and Gilmanton Academy Grant at Dead Diamond River) [June] (10; PMCh), Fabyaus (Ammonoosuc River) [July] (10; ANSP, CAS, MCZ, UMMZ), Mount Jefferson ([1520m]) (3; FMNH), Mount Washington ([760m-1520m] and Base Station [520m], Great Gap, Halfway House [1160m], Hermit Lake [1220m], Lake of the Clouds [1550m], Pinkham Notch, summit [1920m], The Flume, Tuckerman Ravine [610m-1220m]) [June-Sept.] (121; ALar, AMNH, ANSP, CAS, CUIC,

DHKa, FMNH, HGou, MCZ, PADA, PMCh, RTBe, UASM, USNM), Peabody River
 [July] (1; USNM), Randolph [Aug.] (2; AMNH), Shelburne [July] (2; MCZ);
 Grafton Co., Monroe (Connecticut River) [Aug.-Sept.] (4; PMCh, RTBe),
 Mount Moosilauke [July] (1; USNM), Plymouth [Aug.] (1; MCZ), Rumney
 [Sept.] (1; MCZ); Hillsboro, Merrimack (Souhegan River) [Aug.] (3;
 PMCh); Sullivan Co., Claremont (Connecticut River) [June-July] (13;
 PMCh), Cornish Mills (Connecticut River) [Aug.] (4; PMCh). NEW JERSEY:
 Cape May Co., Anglesea (1; CAS); Warren Co., Phillipsburg [May, July-
 Sept.] (17; CAS, UASM). NEW YORK: (18; AMNH, CAS, DHKa, INHS, KUSM,
 MCZ, USNM); Broome Co., Chenango State Park [Aug.] (3; GRNo);
 Cattaraugus Co., Allegany State Park [July-Aug.] (7; CUIC, USNM);
 Chautauqua Co., [Aug.] (1; USNM), Ellington area [July] (1; UASM),
 Findley Lake [July] (16; UASM), Mayville [July] (1; UASM); Chenango Co.,
 [July] (2; USNM); Clinton Co., Plattsburg [July] (1; USNM); Erie Co.,
 Buffalo (4; ANSP, USNM), Colden [Aug.] (1; USNM), Hamburg [Sept.] (3;
 CAS), Lancaster (1; UCB); Essex Co., Heart Lake [Aug.] (8; CAS, CUIC),
 Keane Valley [Aug.] (1; CUIC), Lake Placid [July] (3; CAS), Mount
 MacIntyre [June, Aug.] (9; CUIC), Opalescent River ([530m]) [Aug.] (2;
 RTBe), Wallface Mountain [July] (1; CAS); Fulton Co., [June] (1; USNM);
 Greene Co., (1; ICCM); Herkimer Co., Darts [June] (1; FMNH); Livingstone
 Co., Dansville [Aug.] (1; USNM); Monroe Co., Forest Lawn [July] (1;
 AMNH), Rochester [Sept.] (2; LACM); Niagara Co., Niagara (2; AMNH,
 MCZ), Olcott [July] (2; CUIC); Orange Co., Mountainville [June] (1;
 FMNH); Putnam Co., Brewster (2 mi. nw.) [Aug.] (3; PURC); St. Lawrence
 Co., Lisbon [Sept.] (2; UMMZ), Waddington [June] (3; CAS, CUIC);
 Schuyler Co., [June] (1; UWBM), Watkins Glen [Aug.] (5; AMNH, MCZ, PURC);

Sullivan Co., Beaverkill (1; AMNH), Roscoe (Willowemoc Creek at Highway 17 [430m]) [June] (4; DHKa); Tompkins Co., Cayuga Lake [Oct.] (4; UASM), Dryden (5.5 mi. wsw. at Fall Creek [270m]) [May] (10; DHKa), Falls State Park (beach at Taughannoch) [May] (2; USNM), Ithaca (and Cascadilla Creek, 5 mi. sw. at Inlet Creek [150m]) [May-Oct.] (122; AMNH, CAS, CUIC, DEUN, DHKa, KSUC, MCZ, PURC, UASM), McLean [June, Aug.] (3; CUIC, UASM); Ulster Co., Oliverea (17 mi. sw. at West Branch Neversink Creek [610m]) [June] (7; DHKa); Warren Co., Lake George (Silver Bay) [Sept.] (2; CUIC); Washington Co., Hulett's Landing (6; ICCM), Lake George (1; ICCM); Wayne Co., [June, Sept.] (11; UASM); Wyoming Co., Pike [July] (1; MCZ); County unknown, Hemlock Mountain [June] (5; AMNH), Winton (1; MCZ). NORTH CAROLINA: Avery Co., Cranberry (1; FMNH); Yancey Co., Crabtree Falls (10 mi. e. of Mount Mitchell) [June] (1; RTBe). OHIO: Ashland Co., [May] (6; PURC), Vermillion Township [June] (11; PURC); Ashtabula Co., [Sept.] (6; PURC), Ashtabula [June] (4; PURC), Jefferson [June] (4; PURC), Rock Creek [May-June] (38; PURC); Athens Co., [Oct.] (2; USNM), Athens [May, Oct.] (2; LACM, OSUO), Canaan Township [May] (1; OSUO), Carbondale [July] (1; LACM), Frost [Sept.] (1; UIMI); Butler Co., Heuston Woods State Park [June] (3; RCGr); Columbiana Co., Lisbon [May] (3; PURC); Coshocton Co., Newcastle Township (Walhonding River) [July] (1; PURC), Tiverton Township [Apr.] (1; PURC); Crawford Co., Bucyrus area [June] (5; PURC), Jefferson Township (Sandusky River) [June] (3; PURC); Cuyahoga Co., Cleveland (and Rocky River Reservoir) [May-June, Aug.] (8; MCZ, RTBe, USNM); Delaware Co., [Sept.] (2; OSUC); Franklin Co., Columbus [Apr.-May] (20; PURC), Georgesville [May] (8; PURC); Greene Co., [Sept.] (1; OSUC); Hamilton Co., Cincinnati [May, Aug.] (2; MCZ, UMMZ); Hancock Co., Allen

Township [May] (9; PURC), Cass Township [June] (2; PURC), Madison Township (Eagle Creek) [June] (1; PURC), Mount Blanchard (Blanchard River) [May] (3; PURC), Orange Township (Little Riley Creek) [May] (2; PURC), Union Township [July] (1; PURC); Hocking Co., [June] (69; OSEC, OSUC, PURC), Cedar Falls State Park [June, Aug.] (2; OSUO, PURC), Old Man's Cave State Park [July-Aug.] (5; CAS, PURC); Holmes Co., [May] (15; PURC), Holmesville [May] (1; PURC); Licking Co., [Oct.] (3; OSUC); Lorain Co., Brownhelm Township [Aug.] (1; PURC); Lucas Co., (1; PURC); Mahoning Co., Youngstown (Mill Creek Park) [May, Sept.] (11; PURC); Medina Co., Valley City [May] (6; PURC); Preble Co., [Aug.] (1; PURC), West Alexandria [May, Sept.] (2; RTBe); Portage Co., Charleston Township [Aug.] (6; PURC), Nelson Ledges State Park [June] (12; PURC), Windham Township [Aug.] (3; PURC); Putnam Co., Cascade (Anglaize River) [June] (3; PURC), Jennings Township [July] (1; PURC), Sugar Creek Township (Sugar Creek) [June] (2; PURC), Union Township (Sugar Creek) [June] (2; PURC); Richland Co., Springfield Township (Lake Walker) [July] (1; PURC); Sandusky Co., [June] (1; PURC); Vinton Co., Salt Creek [Oct.] (2; LACM), Zaleski State Forest [June] (2; LACM); Wood Co., [Apr.] (11; PURC), Grand Rapids [Oct.] (3; RCGr); Wyandot Co., Richland Township [June] (2; PURC), Sycamore [Aug.-Sept.] (5; CAS). PENNSYLVANIA: (7; CAS, MCZ, UMMZ, USNM); Allegheny Co., [May-June, Oct.] (21; CUIC, ICCM), Allegheny (7; ICCM, KUSM, MCZ), Fair Oaks [July] (1; UASM), Pittsburgh [May-Sept.] (46; CAS, DZEC, ICCM, KUSM, OSUC, OSUO, UASM), Wildwood [Sept.] (4; ICCM); Armstrong Co., Ford City [June] (11; ICCM); Beaver Co., Raccoon Creek State Park [Aug.] (1; ICCM); Blair Co., Hollidaysburg (6 mi. e. on Highway 22) [June] (2; DJLa); Bradford Co., Wilawana [July] (2; LACM); Bucks Co., Delaware River (near Uhlerstown) [Oct.] (3; USNM);

Center Co., Philipsburg [May] (11; CAS); Crawford Co., Meadville [Aug.] (1; VMKi); Dauphin Co., Clark's Ferry [May] (1; VMKi), Harrisburg [May-Oct.] (5; CUIC, PADA), Inglenook [Sept.] (3; CAS); Delaware Co., Broomall [May] (1; AMNH); Erie Co., North East [Sept.] (3; CUIC, PADA); Fayette Co., Ohiopyle [July] (8; PSUC); Forest Co., Cooksburg Forest State Park (Cooksburg) [June] (7; RTBe); Lebanon Co., Lebanon (2 mi. n.) [Sept.] (5; UMMZ); Mifflin Co., Poe Paddy Recreation Area [July] (2; PSUC); Monroe Co., Mount Pocono [Sept.] (1; CAS); Northampton Co., Easton [June] (3; CAS), Lehigh Gap [Sept.] (1; USNM); Perry Co., Crow's Ferry [Sept.] (6; USNM), Newport [May] (3; USNM); Snyder Co., Middleburg [July] (1; UMRM); Susquehanna Co., Montrose [Aug.] (2; CAS, UCD); Warren Co., [Sept.] (2; UMMZ); Washington Co., McConnells Mill [July] (2; ICCM); Westmoreland Co., Jeannette [May-July] (48; ICCM); County unknown, Galbraith Gap [July] (1; PSUC), "Gertie's Notch" [Oct.] (4; PADA). TENNESSEE: Carter Co., Elizabethton [Sept.] (2; CAS).

VERMONT: Addison Co., Brandon Gap (2 mi. e.) [July] (1; RTBe), South Lincoln (Cooley Glen Trail) [Sept.] (1; RTBe); Bennington Co., (1; CAS), Bennington (South Stream) [July] (4; RTBe), Sunderland (Bourn Pond) [July] (1; RTBe), West Arlington (Battenkill River) [June] (10; RTBe); Caledonia Co., Burke Mountain [Aug.] (4; RTBe); Chittenden Co., Bolton (Bolton Notch, Gleason Brook, Joiner Brook) [May, July] (12; DHKa, RTBe), Burlington [Sept.] (1; RTBe), Camel's Hump ([910m-1220m]) [July-Aug.] (5; RTBe), Colchester Point [Sept.-Oct.] (21; CAS, RTBe), Jerico (Browns River) [Oct.] (1; RTBe), Jonesville (Gillette Pond, Winooski River) [June, Sept.] (4; RTBe), Milton (Lamoille River) [June] (2; RTBe), Mount Mansfield (summit, Sunset Ridge Trail [700m]) [June, July] (3; DHKa, RTBe), Shelburne [Sept.] (3; RTBe), Underhill [July] (4;

RTBe), Westford [Oct.] (1; RTBe); Essex Co., Beecher Falls (1 mi. e. at Connecticut River [340m]) [July] (5; RTBe), Granby (Moose River [350m]) [July] (3; RTBe), Lemington (3 mi. n. at Connecticut River [300m]) [July] (6; HoKn, RTBe), Maidstone (Connecticut River) [July] (8; RTBe); Franklin Co., East Georgia (south bank Lamoille River) [June] (8; RTBe); Grand Isle Co., Grand Isle (Eagle Creek) [July] (1; MCZ), Isle La Motte (Fleury Bay) [Sept.-Oct.] (17; RDav, RTBe); Lamoille Co., Bingham Falls ([380m]) [May-Aug.] (35; HoKn, RTBe, USNM), Elmore (Bedell Brook, Elmore State Park) [July-Aug.] (42; RTBe), Jeffersonville (Brewster River) [May, July-Aug.] (12; RTBe), Johnson (Ithiel Falls, 3 mi. nw. at Judevine Brook, Lamoille River) [June] (8; RTBe), Morrisville (Beaver Meadow Trail) [Aug.] (3; RTBe), Moscow (Nebraska Notch) [July] (1; RTBe), Mount Mansfield (Pringle's Ravine, Smugglers Notch [550m-700m], Canyon Trail) [May-Aug.] (50; HoKn, RTBe), South Cambridge (Brewster River) [June] (4; RTBe), Spruce Peak (Sterling Brook, Sterling Pond, Sterling Pond Trail) [July] (13; RTBe), Stowe (and 6 mi. n. [340m], Little River) [July-Aug.] (12; PMCh, RTBe, USNM), Waterville (North Branch Lamoille River, 2 mi. e.) [June, Sept.] (15; DHKa, RTBe), West Elmore (Bedell Brook) [July-Aug.] (151; CAS, RTBe); Orleans Co., East Charleston [July] (2; RTBe), Westmore (Long Pond Stream) [July] (1; RTBe); Rutland Co., Danby (Flower Brook) [July] (2; RTBe), Mount Tabor (Big Branch Creek) [June] (35; HoKn, RTBe); Washington Co., North Duxbury (0.75 mi. to 3.0 mi. s. on Ridley Brook [150m-240m]) [May-July, Sept.] (30; DHKa, RTBe); Windham Co., Brookline (Grassy Brook, Putney Mountain) [June] (8; RTBe), Dover (Blue Brook, Mount Pisgah Trail) [Aug.] (3; RTBe), Grafton (Saxtons River) [Aug.] (1; RTBe), Guilford (Broad Brook) [Aug.] (3; RTBe), Jamaica (West River) [June] (7; RTBe),

Newfane (Rock River) [June] (3; RTBe), Putney (Sacketts Brook) [July] (4; RTBe); Windsor Co., Windsor (Brownsville Brook) [June] (1; RTBe); County unknown, Mud City [July] (2; RTBe). VIRGINIA: Arlington Co., Alexandria [Sept.] (1; USNM), Rosslyn [Aug.] (2; USNM); Bath Co., Williamsville [Sept.] (1; USNM); Bedford Co., Goose Creek (near Moneta) [Sept.] (1; HoKn); Bland Co., South Gap (Wolf Creek) (2; HoKn); Carroll Co., Big Reed Island Creek [Aug.] (3; HoKn); Fairfax Co., [Sept.-Oct.] (3; MCZ, USNM), Black Pond [Oct.] (6; USNM), Potomac River (at Great Falls) [Sept.] (1; UWEM), Turkey Run (2 mi. e. of McLean) [Sept.] (10; HoKn, LRus, RTBe); Giles Co., Eggleston (New River) [Oct.] (3; HoKn); Grayson Co., Volney (3 mi. e. on Highway 58) [June] (4; DJLa); Highland Co., Bullpasture River Gorge (3 mi. ne. of Williamsville) [June] (2; HoKn); Montgomery Co., Radford (2 mi. e.) [Oct.] (4; HoKn, LRus, RTBe); Washington Co., Damascus (1 mi. s.) [Sept.] (1; HoKn); Wythe Co., Carter Wayside (2 mi. e. of Fort Chiswell at Reed Creek) [Oct.] (15; HoKn, LRus). WEST VIRGINIA: (4; CAS, USNM); Jefferson Co., Harpers Ferry [July] (1; DHKa); Ohio Co., Wheeling [June] (1; ICCM); Pocahontas Co., Highway 250 (2.6 mi. nw. of Virginia border) [Sept.] (4; UASM), Cranberry Glades (10 mi. n. of Visitor Center on Highway 150 [1400m]) [June] (6; HoKn); Randolph Co., (1; ICCM), Cheat Bridge [Sept.] (3; UASM), Shaver Fork Cheat River [May] (2; LACM, UIMI); Taylor Co., Grafton (2; USNM); County unknown, "Ft. Pendltn" [Sept.] (1; USNM). WISCONSIN: (6; INHS, SDSU); Bayfield Co., Bayfield (8; AMNH, CAS, DEUN, MCZ, USNM, UWEM); Columbia Co., Kilbourn [July] (1; UMMZ); Grant Co., Wyalusing State Park [July] (2; RTBe).

Doubtful Records. UNITED STATES OF AMERICA, TEXAS: (1; USNM).

No Data. (13; LEMC, PSUC, ROM, RTBe, USNM, UWEM).

Nebria lacustris bellorum Kavanaugh, NEW SUBSPECIES

Specimens examined: 264 (131♂, 133♀)

UNITED STATES OF AMERICA

NORTH CAROLINA: Great Smoky Mountains National Park [June] (1; MCZ), Indian Gap [Sept.] (1; USNM), Kephard Prong Oconaluftee River [Aug.] (14; DHKa, TCBa), Newfound Gap ([1520m-1580m]) [Aug.] (1; MCZ), Oconaluftee River (11 mi. se. of Newfound Gap on Highway 441 [550m], 2.3 mi. nw. of Smokemont [610m]) [May] (47; DHKa, USNM), Smokemont Loop Trail ([760m-910m]) [July] (18; UAFA); Haywood Co., Beach Gap (7 mi. e. of Sunburst at Middle Prong West Fork Pigeon River [1520m]) [June, Aug.] (4; HoKn), Bubbling Spring Branch ([1520m]) [July] (10; DHKa, TCBa), Graveyard Fields (Blue Ridge Parkway at Yellowstone Prong Pigeon River [1540m]) [May] (1; DHKa), Mount Sterling ([910m]) [Oct.] (7; CAS, CUIC), Retreat [May] (6; USNM); Swain Co., Bryson City (Deep Creek [610m]) [Aug.] (2; MCZ). TENNESSEE: Great Smoky Mountains National Park, Alum Cave Creek ([1220m-1250m]) [May] (4; DHKa), Chimneys Camp ([910m]) [May, Sept.] (18; CAS, CUIC, USNM), Newfound Gap ([1520m-1580m]) [Aug.] (2; MCZ, UASM), Tennessee Branch Bradley Creek ([980m]) [May] (15; USNM), Walker Prong Little Pigeon River [Aug.] (1; DHKa), West Prong Little Pigeon River ([1040m-1220m] and Chimneys Picnic Area [910m], 3 mi. s. of Gatlinburg [520m], 3.7 mi. n. of Newfound Gap [1220m]) [May, July, Sept.] (109; DHKa, MCZ, UAFA, USNM); Sevier Co., Gatlinburg [June] (1; DHKa).

Doubtful Records. UNITED STATES OF AMERICA, COLORADO: Jefferson Co.,

Golden (Clear Creek) [June] (1; USNM). LOUISIANA: St. Tammany Parish, Highway 90 (10 mi. w. of Mississippi border) [June] (1; CAS).

Nebria lyelli Van Dyke

Map: Figure 390

Specimens examined: 19 (15♂, 4♀)

UNITED STATES OF AMERICA

CALIFORNIA: Yosemite National Park, Mount Lyell (below Lyell Glacier [3350m-3510m]) [July-Sept.] (19; CAS, DHKa).

Nebria mannerheimi Fischer

Map: Figure 399

Specimens examined: 2948 (1546♂, 1402♀)

CANADA

BRITISH COLUMBIA: (5; AMNH, INHS, LEMC); Mount Revelstoke National Park [July] (2; CAS); Other localities, Agassiz [June] (1; INHS), Boswell [May, Sept.] (5; CNC, UBC), CheeKye [Aug.] (4; UBC), Chilliwack area (MacGillivray Creek) [July] (1; CNC), Downie Creek [Aug.] (1; CAS), Edgewood [Aug.] (4; CAS), Fraser River (and between Choate and Haig, between Hope and Lillooet) [June, Aug.] (12; ANSP, USNM, UWEM), Glenora (5; ANSP, ICCM, MSU, USNM), Hazelton [Aug.] (1; CNC), Hope (and 1 mi. n. at Kokahaala Creek) [June-July, Sept.] (9; BFCa, UASM, UBC, UWEM), Hunter Creek (at Restmore Lodge) [July] (4; CAS, DHKa), Kaslo [June] (1; USNM), Kitsegucla River (76 mi. e. of Terrace

[210m]) [July] (2; CNC), Klehini River (Haines Highway mi. 50) [June] (4; CNC, UASM), Kootenay Bay [May] (1; UASM), Kootenay Lake (Lockhart Beach) [Aug.] (16; WSU), Ladner (10 mi. e.) [June] (1; UASM), Lake Alice Provincial Park (0.2 mi. n. of Stump Lake at CheeKye River [100m]) [Aug.] (47; CAS, DHKa), Lillooet (Seton Creek) [June] (11; CNC, UASM), Mara Lake [Aug.] (1; BFCa), Mission City [June] (1; CNC), New Westminster (Fraser River) [June] (5; CNC, UASM), North Bend [June] (6; UWEM), North Vancouver [June] (6; UWEM), Price Creek (near Kitwanga) [June] (3; UASM), Quesnel Lake [Sept.] (4; CAS, KUSM), Revelstoke [Aug.] (8; BFCa, CUIIC, MCZ), Riondel [Oct.-Nov.] (3; CNC, UBC), Seltat Creek (Haines Highway mi. 48.8) [June] (1; UASM), Shuswap Lake (Narrows) [Aug.] (1; UBC), Sicamous [July] (3; UASM), Terrace (and 7 mi. e.) [June] (5; CNC, MCZ, USNM), Thompson River (near Ashcroft) [June] (1; JVMA), Vancouver [June] (3; ANSP, CAS, UWEM), Wigwam Inn [June] (6; CAS), Zymoetz River (ne. of Terrace) [June] (6; UASM); Queen Charlotte Islands, Graham Island (Masset and 10 mi. s., 2 mi. sw. and 5 mi. s. of Port Clements, Yakoun River) [July-Aug.] (63; CAS, CUIIC, DHKa, ICCM, MCZ, UASM, UWEM, WSU); Vancouver Island [June] (13; CAS, CNC, JVMA, USNM), Abernathy Brook (e. of Youbou) [Aug.] (22; UASM), Cameron Lake [July] (2; BFCa), Chase River (near Nanaimo) [Aug.] (6; UASM), Cowichan Lake [June-July] (6; CAS, CNC), Departure Bay [June] (9; ROM), Duncan [Aug.-Oct.] (23; CAS, CNC, CUIIC, MCZ, UASM, UBC), Englishman River Falls Provincial Park (3 mi. w. of Parksville) [Aug.] (6; UASM), Goldstream [May-June, Sept.] (4; CUIIC, MSU, UWEM), Kennedy Lake [June] (1; UWEM), MacMillan Provincial Park (12 mi. e. of Port Alberni) [Aug.] (3; UASM), Nanaimo (Chase River) [Sept.] (3; USNM, UWEM), Nanaimo River (at Highway 1) [May] (21; CNC, UASM), Nanoose [Aug.] (3; UWEM), Parksville [July-Aug.]

(12; BFCa, LACM, UWBM), Port Hardy [June] (4; UBC, UWBM), Sidney [Sept.] (2; MCZ), Storms [July] (5; BFCa), Victoria [June-Aug.] (35; ANSP, CAS, DEUN, INHS, ISUI, LACM, MCZ, ROM, UASM, USNM, UWEM), Wellington [July] (1; UWBM), West Cameron Creek (9 mi. e. of Port Alberni) [Aug.] (1; UASM).

UNITED STATES OF AMERICA

ALASKA: Big Boulder Creek (Haines Highway mi. 34) [June] (18; MCZ, UASM), Cape Yakataga [June, July] (1; CAS, JVMa), Juneau [June] (23; CAS, CUIC, JSch, MCZ, OSUC), Lawing [June] (1; CNC), Little Boulder Creek (Haines Highway mi. 31) [June] (22; MCZ, UASM), Muir Glacier (1; USNM), Muir Inlet (Glacier Bay) [June-July] (23; MCZ, OSUC, USNM, UWEM), Seabee Island [July] (2; OSUC), Seward [June] (17; CNC), Sitka [June] (4; USNM), Skagway [July] (8; CAS), Snow River delta [June] (2; CNC), Worthington Glacier (Richardson Highway mi. 28.7) [Aug.] (4; UASM), Wrangell Island (Wrangell) (1; USNM), Yakutat [June] (1; USNM). IDAHO: (1; SDSU); Washington Co., Weiser [Oct.] (2; USNM). OREGON: (5; ANSP, CAS, INHS, MSU, USNM); Baker Co., Robinette [June] (1; UWEM); Benton Co., Corvallis [July] (1; USNM); Clackamas Co., (3; USNM), Brightwood (Salmon River [320m]) [May, July] (72; DHKa, MSU, OSUO), Clackamas River [May] (6; DHKa), Mollala River (at Highway 211 [80m]) [July] (15; DHKa), Rhododendron ([490m] and 1 mi. se. at Zigzag River [600m]) [July-Aug.] (62; CAS, DHKa); Gilliam Co., Arlington (and 5 mi. w. at Columbia River) [Apr.-May] (7; INHS, JSch, MSU); Hood River Co., Hood River (and 0.2 mi. s. on Hood River [60m]) [May-July, Sept.] (183; CAS, DHKa, MCZ, OSUO, USNM), Mount Hood (and 4.2 mi. s. of Mount Hood Post Office at East Fork Hood River [730m], White River) [July] (42; CAS, DHKa, MCZ, UASM, UWEM),

Parkdale (Hood River Rapids) [July] (24; AMNH, ANSP, CAS, ICCM, MCZ, PURC, USNM, WSU), Polallie Campground [May] (16; JSch, MSU, NMDo); Lane Co., Oakridge (at Salmon River [350m], 9.5 mi. se. at Salt Creek [610m]) [July] (171; DHKa), Nimrod (0.9 mi. w. at McKenzie River [270m]) [July] (70; DHKa), North Fork McKenzie River (at Boulder Creek [520m]) [July] (3; DHKa), Salmon Creek (10.6 mi. e. of Oakridge at Blue Pool Campground [610m]) [June] (2; USNM); Linn Co., Detroit (5 mi. e. and 13 mi. se. at North Santiam River) [Aug.] (3; OSUO); Marion Co., Detroit (and 2.5 mi. e. at North Santiam River [490m], 5 mi. n.) [June-Sept.] (41; CAS, DHKa, LRus), Marion Forks (3.2 mi. s. at North Santiam River [930m]) [Aug.] (4; CAS, DHKa), Mill City (7.4 mi. w. on Little North Santiam River [200m]) [July] (6; DHKa), North Santiam River [July] (2; FMNH); Morrow Co., Boardman [Oct.] (1; USNM); Multnomah Co., Multnomah Falls [May] (5; UWBM), Portland (1; ICCM); Tillamook Co., Lee's Camp (Wilson River) [Apr.] (2; MSU); Union Co., Elgin (3.1 mi. nw. at Little Phillips Creek [1030m]) [May] (2; DHKa), La Grande (1 mi. ne. at Grande Ronde River [1070m]) [May] (2; DHKa); Wallowa Co., Minam (0.2 mi. se. at junction of Minam River and Wallowa River [790m]) [May] (14; DHKa); Wasco Co., The Dalles [May, July] (2; FMNH, OSUO). WASHINGTON: [Aug.] (13; CAS, INHS, MCZ, PADA, USNM); Asotin Co., Grande Ronde River [Sept.] (1; SJSC); Chelan Co., Lake Wenatchee State Park [June] (8; ROM), Soda Springs Campground [May] (7; UWBM); Clallam Co., Dungeness [May] (1; UWBM), Elwha [June] (3; UWBM), Elwha River [July] (8; UWBM), Forks [July-Aug.] (6; CAS, UWBM), Klahowya State Park (Soleduck River) [June] (10; CAS), Mora [Sept.] (5; UWBM), Port Angeles (and 4 mi. w.) [May-June] (49; ALar, CAS, CDA, CUIC, DBUM, PADA), Sequim [Sept.] (2; UWBM), Soleduck River (at Bogachiel River) [Aug.] (1; USNM); Clark Co.,

Vancouver (2; CAS), Washougal [Sept.] (1; UWEM); Cowlitz Co., Ariel
 [May] (2; UWEM), Toutle (14 mi. e. at North Fork Toutle River [300m])
 [Aug.] (37; CAS, DHKa), Toutle River [May] (8; UWEM); Grays Harbor Co.,
 Quinault Lake [May] (2; CAS); Island Co., Whidbey Island (Coupeville)
 (1; CAS); Jefferson Co., Brinnon area [May] (2; LACM), Kalaloch Beach
 [Aug.] (6; RTBe), Port Townsend (6; MCZ, PADA); King Co., Carnation
 [May] (48; LRus, NMDo, UWEM), Cedar Mountain [May, July] (33; UWEM),
 Cedar River [May] (5; UWEM), Enumclaw [July] (6; UWEM), Fall City
 (Snoqualmie River) [Sept.] (2; UWEM), Green River [May] (1; UWEM),
 Greenwater (5 mi. w. at White River [490m], Greenwater Campground)
 [June, Aug.] (11; DHKa, UWEM), Issaquah (6 mi. e.) [June] (17; ALar,
 LRus), Maple Valley (Cedar River) [May] (2; UWEM), North Bend (and
 Snoqualmie River at Maloney's Grove) [May-Sept.] (60; CAS, CUIC, FMNH,
 MCZ, UASM, UIMI, UWEM), Renton (and at Cedar River) [May, Sept.] (29;
 UIMI, UWEM), Seattle [Apr.-May] (7; KSUC, UWEM), Skykomish area [July]
 (11; UASM), Snoqualmie [June] (1; UIMI), Snoqualmie Pass [July] (1;
 CAS), Snoqualmie River (at Snoqualmie Falls) [May, Sept.] (2; UWEM),
 White River (at Slippery Creek) [Aug.] (4; UWEM); Klickitat Co., Block-
 house (8.2 mi. nw. at Klickitat River [350m]) [May] (16; DHKa), Glenwood
 [July] (1; OSUO), Trout Lake [July] (2; ANSP), White Salmon [Aug.] (1;
 UWEM); Lewis Co., Carlson (8.4 mi. s. at East Fork Tilton River [350m])
 [July] (18; DHKa); Mason Co., Lake Cushman [June-July] (1; UMMZ),
 Shelton [Aug.] (1; UWEM), Skokomish River [May-June] (4; ANSP, USNM),
 South Fork Skokomish River [July] (18; UWEM); Mount Rainier National
 Park ([1520m]) [July, Sept.] (34; CAS, DHKa, MCZ, MSU, UBC), Carbon
 Glacier [Sept.] (1; UWEM), Carbon River [July] (9; FMNH, UWEM),
 Fryingpan Creek ([1160m]) [Aug.] (19; CNC, SJSC), Kautz Creek (at

Nisqually River) [Sept.] (2; UWEM), Longmire [July-Sept.] (35; CAS, UWEM), Nisqually River (and at Cougar Rock Campground [960m], near Longmire, 0.1 mi. above Paradise River [980m], at Sunshine Point Campground [610m]) [July-Sept.] (100; CAS, DHKa, MCZ, UWEM), North Fork Puyallup River (below toe of Puyallup Glacier [1100m]) [Aug.] (3; DHKa), Ohanapecosh [Aug.] (1; USNM), Paradise area (Paradise Valley [1520m-1830m]) [Aug.] (1; CAS), Sunrise area [July] (24; CAS, LRus), White River (and at White River Campground [1190m-1520m]) [May, July-Sept.] (52; CAS, DHKa, FMNH, SJSC, UWEM); Okanogan Co., Dan's Creek [Aug.] (7; UWEM); Olympic National Park [July-Aug.] (23; AMNH, CUIC, LACM, MCZ, USNM), Elwha Campground [Aug.] (29; CUIC, RTBe), Hoh River ([150m], and 20 mi. e. of Highway 101, Hoh River Campground, Jackson Campground) [June-Aug.] (61; CAS, DHKa, FMNH, LRus, ROM, USNM, UWEM), Lake Crescent [June, Aug.-Sept.] (27; CAS, CUIC, UIMI, UWEM), Sol Duc Hot Springs [June, Sept.] (4; UWEM); Pacific Co., Bay Center [Aug.] (5; UWEM); Pierce Co., American Lake [Apr.] (6; UWEM), Ashford (4 mi. e. on Nisqually River at Goat Creek [590m]) [July] (74; DHKa), Elbe (Nisqually River [400m]) [July-Aug.] (196; DHKa), Fairfax (Carbon River) [Aug., Oct.] (2; FMNH, UWEM), Fort Lewis [May] (2; CAS), Nisqually River [May] (1; UWEM), White River (at Silver Springs Campground [760m-790m]) [June, Aug.] (92; DHKa, UASM, USNM); Skagit Co., Skagit River [Aug.] (3; UWEM), Van Horn [Apr.-May] (12; AMNH, UWEM); Skamania Co., Carson [Aug.] (4; UIMI), Columbia River (15 mi. w. of Underwood[90m]) [May] (39; DHKa), Cook [July] (1; UWEM), Mount St. Helens (north slope at Leschi Creek [980m]) [Aug.] (8; CAS, DHKa), North Fork Toutle River (at Spirit Lake Lodge [940m]) [Aug.] (1; DHKa), Stevenson [June] (1; UWEM), Wind River (8 mi. n. of Carson [340m]) [July] (3; DHKa); Snohomish Co., Arlington

(and at North Fork Stillaguamish River) [Aug.] (25; SDSU, UWBM), Cicero (North Fork Stillaguamish River) [Aug.] (1; UWBM), Fortson [Apr.] (1; UWBM), French Creek (at North Fork Stillaguamish River) [Aug.] (1; UWBM), Glacier Peak [July] (1; CAS), Hazel [May] (5; UWBM), Index [May] (8; UWBM), Monroe [July] (4; CAS), Silver Lake [Aug.] (4; UWBM), Stillaguamish River [Mar.-Apr., July] (6; UWBM); Thurston Co., Deschutes River [May] (1; UWBM); Walla Walla Co., Burbank [May] (1; ANSP), Walla Walla [Aug.] (11; MCZ, OSUO); Whatcom Co., Glacier (and 3 mi. e.) [July] (39; CAS, DHKa, LRus), Lynden [Apr.] (4; LRus), Mount Baker [Sept.] (4; CAS, UWBM), North Fork Nooksack River (4 mi. e. [380m] and 19 mi. w. [270m] of Glacier, Silver Fir Campground [610m]) [Aug.] (46; CAS, DHKa), Shuksan ([760m]) [Aug.] (1; LRus), Shuksan Creek [Aug.] (5; UWBM), Skagit River (at Newhalem Campground) [July] (2; UWBM); Whitman Co., Central Ferry [Sept.] (1; UWBM), Pullman [May-June] (4; NMDo, WSU), Riparia [Apr.] (1; USNM), Wawawai ([300m], and 2 mi. nw. at Snake River [290m]) [May, July-Aug.] (16; CAS, DHKa, USNM, WSU), Wilma [May] (3; ICCM); County unknown, Olympic National Forest [Aug.] (1; CAS).

Doubtful Records. CANADA, YUKON TERRITORY: Swift River (Alaska Highway mi. 733.3) [Aug.] (4; LRus). UNITED STATES OF AMERICA, CALIFORNIA: (14; ANSP, KUSM, MCZ). NEVADA: Washoe Co., Verdi (2; CAS).

No Data. (9; AMNH, OSUO, UWBM).

Nebria meanyi Van Dyke

Map: Figure 406

Nebria meanyi meanyi Van Dyke

Specimens examined: 617 (285♂, 332♀)

CANADA

BRITISH COLUMBIA: Chilkat Pass (Haines Highway) [June] (1; CNC), Clear Creek (Haines Highway mi. 61.3) [June-Aug.] (15; UASM), Garibaldi Provincial Park ([1550m] and south slope Black Tusk [1830m-2040m], Whistler Mountain [1830m]) [July-Aug.] (29; CAS, CNC, DHKa), Leduc Glacier (35 mi. nw. of Stewart) [Aug.] (1; UBC). YUKON TERRITORY: Whitehorse Pass [July] (1; CAS).

UNITED STATES OF AMERICA

ALASKA: Little Boulder Creek (Haines Highway mi. 31) [June] (1; MCZ). CALIFORNIA: Siskiyou Co., Mount Shasta (Mud Creek at Clear Creek [1980m]) [Aug.] (45; CAS, DHKa). OREGON: Clackamas Co., Mount Hood (headwaters of Salmon River near Timberline Lodge [1830m-1950m]) [Aug.] (21; CAS, DHKa); Deschutes Co., Middle Sister Peak (North Fork Squaw Creek [1950m-2190m]) [Aug.] (150; CAS, DHKa); Hood River Co., Mount Hood (White River ([1300m] and at White River Glacier) [July-Aug.] (63; AMNH, CAS, DHKa, KUSM, MCZ, UASM, USNM); Marion Co., Mount Jefferson (Russell Creek [1680m-2190m]) [Aug.] (17; CAS, DHKa). WASHINGTON: Mount Rainier National Park [July] (11; CAS, CUIC, MCZ, UASM), Carbon River ([610m-910m]) [Oct.] (1; FMNH), Narada Falls (Paradise River [1160m-1460m]) [July-Aug.] (3; DHKa, USNM, UWEM), Nisqually River ([1160m-1420m], at toe of Nisqually Glacier [1220m-1520m], 0.1 mi. above Paradise River [980m]) [July-Sept.] (132; CAS, DHKa, MCZ), North Fork Puyallup River ([1130m] and below toe of Puyallup Glacier [1100m-1650m]) [Aug.] (59; CNC, DHKa), Paradise area (Paradise

Glacier, Paradise Park, Paradise River [1400m-1830m], Paradise Valley) [June-Aug.] (26; CAS, CNC, CUIC, DHKa, USNM, UWEM), Sluskin Falls [July-Aug.] (33; JSch, UWEM), Van Trump Creek (above Christine Falls [1220m-1280m]) [July] (2; DHKa), White River (at White River Campground [1310m-1520m]) [July] (3; FMNH); Snohomish Co., Glacier Peak [July-Aug.] (3; CAS, UWEM); Whatcom Co., Mount Baker (Heather Meadows Ski Area near Austin Pass [1190m-1310m]) [Aug.] (1; DHKa).

Doubtful Records. CANADA, ALBERTA: Jasper National Park, Mount Edith Cavell (1; ROM). UNITED STATES OF AMERICA, CALIFORNIA: Mendocino Co., Longvale Creek [July] (1; CAS).

Nebria meanyi lamarckensis Kavanaugh, NEW SUBSPECIES

Specimens examined: 23 (7♂, 16♀)

UNITED STATES OF AMERICA

CALIFORNIA: Inyo Co., Big Pine Creek (below Finger Lake [3140m]) [Aug.] (2; CAS), Lamarck Creek (above Upper Lamarck Lake [3260m-3350m]) [July] (21; DHKa).

Nebria meanyi sylvatica Kavanaugh, NEW SUBSPECIES

Specimens examined: 179 (84♂, 95♀)

CANADA

BRITISH COLUMBIA: Vancouver Island, Alberni (38 mi. w.) [May] (1; CNC).

UNITED STATES OF AMERICA

WASHINGTON: Olympic National Park [Aug.] (11; ICCM, MCZ, UASM, USNM), Elwha River (at Elwha Campground) [Aug.] (1; CUIC), Dosewallips River

(at Muscott Campground) [July] (3; UWEM), Olympic Hot Springs (Boulder Creek [670m-760m]) [May-Aug.] (160; CAS, CNC, DHKa, JSch, UWEM), Sol Duc Hot Springs [July] (3; JSch, UWEM).

Nebria metallica Fischer

Map: Figure 407

Specimens examined: 2298 (1305♂, 993♀)

CANADA

ALBERTA: Entrance (40 mi. wnw. at North Fork Wildhay River [1460m]) [June] (2; UASM), Freeman Lake (10 mi. s. of Swan Hills) [Aug.] (2; HGou), Goose Mountain ([1400m]) [Aug.] (4; HGou). BRITISH COLUMBIA: (9; AMNH, ANSP, FMNH, MCZ); Glacier National Park, Glacier [July, Sept.] (4; CAS, USNM), Rogers Pass ([1310m]) [June] (1; CNC); Other localities, Agassiz [Sept.] (1; CNC), Barkerville (Grouse Creek [1280m]) [Sept.] (1; UBC), Chilkat Pass (Haines Highway mi. 65.1) [June] (1; UASM), Clear Creek (Haines Highway mi. 61.3) [June] (1; UASM), Copper Mountain [Aug.] (3; UBC), Fraser River (between Hope and Lillooet) [Aug.] (1; UWEM), Garibaldi Provincial Park (south slope Black Tusk [1830m-2040m], Diamond Head Trail [1070m]) [July-Aug.] (2; CNC, DHKa), Glenora (1; USNM), Hunter Creek (at Restmore Lodge) [July] (2; CAS), Manning Provincial Park (Pasayten River) [May] (11; CNC, USNM), Merritt (Midday Valley) [July] (2; CAS), New Westminster (Fraser River) [June] (2; CNC), Peachland [June] (1; UASM), Pine Pass [June] (1; CNC), Seltat Creek (Haines Highway mi. 49) [June] (4; CNC, UASM), Skagit River (at Hope Trail [760m]) [July] (5; UBC), Snass Creek (at Warburton

Trail [760m]) [July] (1; UBC), Spious Creek [May] (2; CAS), Stanley [June] (1; UBC), Stikine River (6; ANSP, CAS, DEUN, ICCM, USNM), Two Sisters Mountain (15 mi. e. of Barkerville [1370m]) [June] (1; CNC), Vancouver [June] (4; MCZ, NMDo, USNM), Whipsaw Creek (at Hope Trail [1220m]) [July] (6; UBC, USNM), Vancouver Island (1; MCZ).

UNITED STATES OF AMERICA

ALASKA: (72; AMNH, CAS, CUIC, DHKa, INHS, KSUC, KUSM, LACM, MCZ, UMMZ, UMRM, USNM); Afognak Island [June-Aug.] (22; FMNH, UWEM), Anchor Point (Anchor River) [July] (4; UASM), Anchorage (and Elmendorf area) [July] (4; MCZ, UWEM), Baranof Island (Sitka) (14; ANSP, ICCM, INHS, MCZ, UASM, WSU), Belkovsky [July] (1; USNM), Bird Creek (27 mi. se. of Anchorage) [July] (22; CNC, UASM), Bristol Bay (Lake Brooks) [June-Sept.] (2; UWEM), Cold Bay [July-Aug.] (260; CNC, DHKa, MCZ, UASM), Cooper Landing (Stetson Creek) [Aug.] (3; CNC), Goodnews Bay [July] (2; USNM), Haines (8 mi. nw.) [July] (1; CNC), Hope [670m] [July] (1; CNC), Izembek Wildlife Refuge (Frosty Creek [60m], Simeon Mountain [240m]) [July] (24; DHKa), Juneau [June] (10; CAS, ICCM), Katalla [July] (2; CAS), Katmai [July] (5; CAS, OSUC, USNM), Knik River (at Glenn Highway) [July-Aug.] (19; MCZ, UASM), Kodiak Island ([270m-730m] and Amara Lake [150m-370m], Anton Larson Bay, Bare Lake [370m-640m], Bear Lake, Kalsin Bay, Karluk Lake, Kodiak area, Olga Bay, Port Bailey, Old Womans Mountain, Pasagshak Bay, Pinguicula Lake, Shasta Creek [240m], Uyak) [May-Sept.] (267; CAS, CUIC, DHKa, FMNH, ICCM, MCZ, OSUC, UASM, USNM, UWEM), Lawing [May] (2; CNC), Moose Pass [July] (1; CNC), Mount Pavlof area [Sept.] (1; CAS), Muir Glacier (3; MCZ), Muir Inlet (Glacier Bay) [June] (7; OSUC, USNM), Old Crow Mine (near Girdwood [610m-760m]) [July] (8; UASM),

Palmer (25 mi. n. [1220m]) [Aug.] (4; UASM), Pilot Cove [July] (1; ICCM), Port Heiden [July] (2; UASM), Prince of Wales Island (Craig) [May] (4; UWBM), Savonoski (Naknek Lake) [June-Aug.] (13; CAS, OSUC, PURC, USNM), Sebree Island [July] (1; OSUC), Security Cove (Kuskokwim River) [July] (1; USNM), Seward [May-July] (25; ALar, CAS, CNC, DEUN, ICCM, MCZ), Skagway [June-July] (8; CAS, USNM), Snow River (delta area) [May] (9; CNC), Thompson Pass (Richardson Highway mi. 25 [820m]) [Aug.] (6; MCZ, UASM), Tiekell River (Richardson Highway mi. 57.5) [Aug.] (1; UASM), Valdez (14 to 16 mi. e. on Richardson Highway) [Aug.] (2; MCZ, UASM), White Pass [Aug.] (13; LACM), Worthington Glacier (at Richardson Highway) [Aug.] (1; MCZ); Aleutian Islands (724; DBUM, INHS, MCZ, USNM), Adak Island (Adak, Mount Moffett) [July] (8; MCZ), Akutan Island (Akutan) [Aug.] (9; AMNH, CAS), Amchitka Island [June-Sept.] (6; USNM, UWBM), Atka Island (Nazan Bay) [Aug.] (16; CAS, DBUM), Umnak Island (Crater Creek, Nikolski, Okmok Caldera, Tulik Volcano, Umnak and vicinity) [July] (120; MCZ, UASM, UWBM), Unalaska Island (Amaknak Island, Driftwood Bay, Dutch Harbor, Glacier River, Makushin River at Broad Bay, Mount Makushin [400m-460m], Unalaska and vicinity) [June-Sept.] (135; ANSP, CAS, CUIC, DHKa, ICCM, MCZ, PADA, UASM, USNM); Pribilof Islands, St. Paul Island [May] (3; USNM); Location unknown, Fern Mine [Aug.] (1; UWBM). MONTANA: (1; USNM); Ravalli Co., Sula [July] (1; CAS); County unknown, Bitterroot Mountains (6; CAS, KUSM, USNM). WASHINGTON: (1; CAS); Clallam Co., Forks [July] (1; CAS), Klahowya State Park (Soleduck River) [June] (5; CAS); Jefferson Co., Kalaloch Beach [Aug.] (4; RTBe); King Co., Greenwater [June] (1; UWBM), North Bend [June-July] (23; AMNH, MCZ,

UASM, USNM, UWEM), Slippery Creek (at White River) [Aug.] (1; UWEM), Snoqualmie [May] (1; UWEM), Snoqualmie Falls [May, Aug.-Sept.] (3; UWEM), Wellington [July] (1; KSUC); Mount Rainier National Park, Fryingpan Creek [Aug.] (1; SJSC); Olympic National Park [Aug.] (17; CNC, MCZ, USNM), Dosewallips River [July] (2; UWEM), Elwha River (at Elwha Campground) [Aug.] (1; CUIC), Hoh River Rainforest [May] (1; LRus), Olympic Hot Springs [July] (1; UWEM), Sol Duc Hot Springs [June-Sept.] (14; CAS, UWEM); Pierce Co., White River (at Silver Springs Campground [790m]) [June, Aug.] (178; DHKa, USNM); Snohomish Co., Darrington [May] (2; UWEM), Glacier Peak [July] (1; UWEM), Hazel (Stillaguamish River) (3; UWEM), Monroe [July] (20; CAS, UMRM, UWEM), Sultan [May] (1; UWEM); Whatcom Co., Lynden [June, Aug.-Sept.] (10; LRus, UWEM), North Fork Nooksack River (at Silver Fir Campground [610m]) [Aug.] (2; CAS, DHKa), Shuksan Creek [Aug.] (1; UWEM); Yakima Co., Bumping River [Aug.] (3; UASM, USNM); County unknown, Stillaguamish River [May-June] (3; UWEM).

Doubtful Records. FRENCH POLYNESIA, SOCIETY ISLANDS: Tahiti (1; MHNP). UNITED STATES OF AMERICA, ARIZONA: White Mountains [June] (1; CUIC). CALIFORNIA: Los Angeles Co., Mint Canyon [May] (2; LACM); San Bernardino Co., Lake Arrowhead [July] (4; LACM). OREGON: (1; KUSM).
No Data. (37; AMNH, ANSP, CAS, FMNH, INHS, ISUI, MCZ, MSU, PADA, USNM).

Nebria navajo Kavanaugh, NEW SPECIES

Map: Figure 400

Specimens examined: 2 (2♂)

UNITED STATES OF AMERICA

ARIZONA: Navajo Co., Kayenta (19 mi. sw. [1980m]) [June] (2; CAS).

Nebria nivalis Paykull

Map: Figure 385, 386

Nebria nivalis nivalis Paykull

Specimens examined: 1165 (647♂, 518♀)

CANADA

BRITISH COLUMBIA: Swift River (Alaska Highway mi. 733.3) [Aug.] (1; LRus). NORTHWEST TERRITORIES: District of Franklin, Baffin Island (Cumberland Sound on Blacklead Island, Frobisher Bay, Pangnirtung, Steensby Inlet area) [June, Aug.] (29; ALar, CNC, LEMC, MCZ, USNM), Southampton Island (Coral Harbor) [July] (4; CNC); District of Keewatin, Aberdeen Lake [July] (1; CNC), Baker Lake [July] (5; CNC), Yathkyed Lake [Aug.] (1; CNC); District of Mackenzie, Aklavik [July-Aug.] (34; CAS, USNM), Coppermine [July-Aug.] (13; CNC), Coppermine River (at Bloody Falls) [July] (1; CNC), Fort Smith [July] (1; ALar), Granet Lake [July] (6; CNC), Kazan River [Aug.] (1; CNC), MacKay Lake area (1; CNC), Perry River (8 mi. inland) [July] (3; DJLa, USNM). QUÉBEC: Terr. du Nouveau-Québec, Bellin (=Payne Bay) [July] (1; CNC), Rivière Arnaud (=Payne River) [Aug.] (1; DBUM), Saglouc (=Sugluk) [July] (6; CNC), Wolstenholme [July] (1; UASM). YUKON TERRITORY: (1; CAS); Dawson (14 mi. e. [400m]) [July-Aug.] (11; CNC), Dempster Highway (mi. 28 [760m], mi. 35 [880m], mi. 60 [1010m], mi. 64 [1010m], mi. 78 [1010m]) [July] (14; CNC), Duke River (Alaska Highway mi. 1098) [June]

(5; CNC, UASM), Firth River [Aug.] (1; CNC), Little Salmon Lake [Aug.] (1; CNC), Mayo [July] (1; BFCa), North Fork Pass ([1070m-1250m]) [June] (7; CNC), Rampart House (and 18 mi. s.) [Aug.] (3; CNC).

UNITED STATES OF AMERICA

ALASKA: (12; ANSP, UWEM); Mount McKinley National Park [July] (2; CUIC, USNM), Eilson ([1190m]) [Aug.] (2; MCZ, UASM), Igloo Creek [Aug.] (3; MCZ, UASM), Riley Creek (at Hines Creek [520m]) [July] (16; DHKa, LRus), Savage River (1.2 mi. n. of Denali Highway [730m-810m]) [June-Aug.] (63; CAS, DHKa, UASM); Other localities, Anuk Lake (14 mi. s. of mouth of Cutler River [490m]) [Aug.] (13; RCra), Atkasuk [July-Aug.] (25; LACM, MCZ, UASM), Bear Creek (Steese Highway mi. 97.3 [640m]) [July] (10; DHKa), Beaver Creek (west of) [Aug.] (1; CAS), Black Rapids Glacier (Richardson Highway mi. 227) [July] (14; UASM), Cape Lisburne (1; CAS), Cape Prince of Wales (at mouth of Village Creek) [Aug.] (1; USNM), Cape Thompson [June-July] (11; CNC, WSU), Chatanika River (at Chatanika River Campground [240m]) [July] (30; DHKa), Cold Bay [July] (43; MCZ, UASM), Collinson Point [May] (1; CAS), Deering (1; JVMa), Delta River (at Black Rapids) [July-Aug.] (19; JVMa, MCZ), Eagle Summit (Steese Highway mi. 109) [July] (4; MCZ, UASM), Faith Creek (at Chatanika River [440m]) [July] (17; DHKa), Feniak Lake ([490m]) [July] (48; RCra), Goodnews Bay [Aug.] (4; USNM), Grants Cabin (Toms Lake) [July] (2; CAS), Gulkana [June] (1; UWEM), Ikpihpuk River (at Valley of Willows) [July] (1; JVMa), Isabel Pass (Richardson Highway mi. 206 [880m]) [July] (2; CNC), Kaolak River [Aug.] (4; UCB), Katmai [June-July] (6; CAS, OSUC, USNM), King Salmon (at Naknek Lake) [July] (2; CNC), Koyukuk River (1; USNM), Kuzitrin River (at Coffee Creek) [July] (3; JVMa), Lake

Brooks [June-Sept.] (29; USNM, UWEM), Lake Peters [June] (3; JVMA), Little Nelchina River (Glenn Highway mi. 138) [July] (2; MCZ, UASM), Mammoth Creek (Steese Highway mi. 116) [July] (9; MCZ, UASM), McManus Creek (Steese Highway mi. 76 [590m] and mi. 81.3 [610m]) [July] (63; DHKa), Montana Creek (Steese Highway mi. 83.2 [640m]) [July] (19; DHKa), Naknek Lake (and at Tom's Village) [June-July] (15; CAS, OSUC), Nome (and 30 mi. e., 8 mi. n. at Nome River) [June-Aug.] (43; CAS, ICCM, INHS, JVMA, MCZ, MSU, UASM), North Fork Twelvemile Creek (Steese Highway mi. 93.3 [750m]) [July] (17; DHKa), Pitmegea River (15 mi. e. of Cape Lisburne) [June] (1; MSU), Port Heiden [July] (13; UASM), Ptarmigan Creek (Steese Highway mi. 101.1 [730m]) [July] (7; DHKa), Quinhagak [Aug.] (1; USNM), Reed Creek (at Middle Fork Twelvemile Creek [730m]) [July] (25; DHKa), Robertson River (Alaska Highway mi. 1348) [June] (3; MCZ, UASM), Russian Mission [Aug.] (3; USNM), Savonoski (at Naknek Lake) [July-Aug.] (86; CAS, DHKa, OSUC, PURC, USNM), Security Cove [July] (1; USNM), Seward [June] (2; ICCM), Sinoruk (15 mi. n. of Wales) [July] (3; USNM), Solomon River (37 mi. e. of Nome) [Aug.] (7; MCZ, UASM), Sourdough Creek (Steese Highway mi. 66 [430m]) [July] (13; DHKa), Stuyahok River [July] (1; USNM), Taylor Highway (mi. 27) [July] (2; CNC), Teller (1; CAS), Tiekkel River (Richardson Highway mi. 57.5) [Aug.] (1; UASM), Tok River (Alaska Highway mi. 1309) [June] (8; MCZ, UASM), Umiat [June] (1; USNM), Willow Creek (Steese Highway mi. 95.5 [620m]) [July] (44; DHKa), York [July] (1; USNM), Yukon River (between Holy Cross and Paimuit, between Marshall and Old Andreanofski) [July-Sept.] (3; USNM); Pribilof Islands (3; CAS, USNM, UWEM), St. Paul Island (Big Lake at base of Polovino Hill, St. Paul and 2 mi. n.) [June-Aug.] (132; CAS, CNC, ICCM, MCZ, UASM, USNM, UWEM); St. Lawrence Island,

Koozata Lagoon (west end) [Aug.] (3; UASM); St. Matthew Island [June-Aug.] (17; CNC, JvMa, UASM).

Doubtful Records. CANADA, BRITISH COLUMBIA: Vancouver Island, Union Bay [Apr.] (1; USNM). UNITED STATES OF AMERICA, ALASKA: Sitka (6; ICCM).

Nebria nivalis gaspesiana Kavanaugh, NEW SUBSPECIES

Specimens examined: 289 (120♂, 169♀)

CANADA

NEWFOUNDLAND: Island of Newfoundland, Little Codroy River [July] (4; MCZ, USNM), St. John Bay (Doctors Brook) [July] (5; CNC, ZMLS), South Branch (Grand Codroy River) [July] (4; MCZ), Spruce Brook (1; MCZ).

QUÉBEC: Cté de Bonaventure [July] (1; ALar); Cté de Gaspé-Ouest, Parc de la Gaspésie (Mont Albert at Ruisseau du Diable [980m-1070m]) [June-July] (261; ALar, CNC, DBUM, DHKa, RTBe), Territoire du Nouveau-Québec, Rivière Abloviak [July] (1; DBUM).

UNITED STATES OF AMERICA

MAINE: Piscataquis Co., Baxter State Park (Mount Katahdin [910m-1580m]) [June-Aug.] (10; CAS, MCZ, USNM).

Nebria obliqua LeConte

Map: Figure 395

Specimens examined: 3846 (1965♂, 1881♀)

CANADA

ALBERTA: Banff National Park, Banff (and 1 mi. s. on Bow River) [June-Sept.] (36; CAS, CUIC, DHKa, MCZ, RTBe, UASM, USNM), Bow River [Sept.] (2; USNM), Cascade River (near Banff) [Aug.] (3; UWBM), Lake Louise [Aug.-Sept.] (5; AMNH), Lake Minnewanka [July] (1; UASM), North Saskatchewan River (at Highway 93) [July] (1; DHKa); Jasper National Park, Athabasca River (15 mi. e. of Jasper) [July] (5; DHKa), Cottonwood Creek Campground [Sept.] (3; RTBe), Jasper Lake [Aug.] (1; UASM), Rocky Creek (at Highway 16) [Aug.] (1; UASM); Waterton Lakes National Park, Waterton [June] (3; DJLa); Other localities, Aldersyde area [July] (1; BFCa), Assineau River (near Lesser Slave Lake) [July] (1; DHKa), Athabasca River (3 mi. ne. of Chain Lakes) [Sept.] (31; UASM), Belly River [July] (2; CAS), Blindman River (at Red Deer River) [May] (1; UASM), Cardston (and at Lee Creek) [July] (9; UASM), Cypress Hills [May-June, Aug.] (37; CAS, MCZ, PURC, UASM), Devon (0.2 mi. n. at North Saskatchewan River [700m]) [June] (19; DHKa), Drumheller (2 mi. w.) [Sept.] (1; DHKa), Drywood Creek [May] (1; DJLa), Edmonton (at Emily Murphy Park and 0.1 mi. e. of Groat Bridge on North Saskatchewan River [670m]) [May-June, Aug.-Oct.] (21; DHKa, RTBe, USNM), Elk Creek Campground (30 mi. w. of Caroline) [Aug.] (1; MSU), Forestry Trunk Road (at North Saskatchewan River) [June] (2; DHKa), Fort Macleod [May-June, Aug.] (15; FMNH, UASM, UCD, UMMZ, USNM), Fort McMurray [June-July] (7; CNC), Freeman Lake (10 mi. s. of Swan Hills) [Aug.] (3; HGou), High River [May, Sept.] (3; CAS), Hummingbird Creek area [July] (2; BFCa), James River area (near Willow Creek) [Aug.] (2; BFCa), Lethbridge (Oldman River, St. Mary River) [May-Sept.] (43; CNC, CUIC, DJLa, ICCM,

LRus, MCZ, UASM, USNM), Maycroft [Aug.] (1; DJLa), Medicine Hat (at South Saskatchewan River) [May-Oct.] (93; ALar, AMNH, BFCa, CAS, CNC, CUIc, DBUM, FMNH, KUSM, MCZ, UASM, USNM), Milk River (se. of Comrey, at Lost River Ranch [580m]) [May, July] (5; BFCa, UASM), Moose River [July] (2; DHKa), Morse River (near Fort Assiniboine) [July] (3; UASM), Nordegg [Aug.] (4; DRWh), North Saskatchewan River (near Nordegg, at Highway 11) [July] (9; RFre, UASM), Pincher Creek [May, Aug.] (9; ANSP, DBUM, UASM), Prairie Bluff Mountain [June] (1; UASM), Ram River area [July-Aug.] (2; BFCa), Red Deer [July, Sept.] (4; JVma, UASM), Reesor Lake area [May] (1; USNM), Rock Lake ([1400m]) [June] (1; UASM), Sheep River (and at Gorge Creek) [Aug.] (7; UASM), Spring Creek Basin (Simonette River) [June] (24; UASM), Sundre [July] (7; BFCa), Taber Provincial Park (Oldman River) [July] (3; ROM), The Forks (North Saskatchewan River at Clearwater River [1280m]) [July] (3; ANSP), Wildhay River (20 mi. nnw. of Entrance on Grand Cache Road [1310m], 30 mi. nnw. of Entrance) [June] (2; DHKa, UASM); Location unknown, Morin [Aug.] (1; UASM). BRITISH COLUMBIA: Glacier National Park, Loop Creek [June] (1; UASM); Kootenay National Park, Highway 93 (30 mi. sw. of Highway 1) [June] (1; UASM); Yoho National Park [July] (1; UWBM), Chancellor Peak Campground (Kicking Horse River) [Aug.] (1; UASM), Field (at Kicking Horse River [1460m]) [July-Aug.] (22; CAS, CUIc, DJLa, KUSM, USNM), Kicking Horse Campground [July] (1; CAS); Other localities, Adsett Creek (Alaska Highway mi. 233) [Aug.] (2; UASM), Big Creek (Alaska Highway mi. 674) [Aug.] (1; DHKa), Blanchard River (Haines Highway mi. 93) [June] (8; CNC, UASM), Blue River [June] (1; JVma), Chilcotin [May] (7; UBC), Chilkat Pass ([1070m], and at Kelsall Lake) [July] (4; CNC, UASM), Creston (2 mi. w. at Kootenay River) [July]

(4; DHKa), Elk Creek (e. of Fernie) [July] (2; UASM), Fernie [July-Aug.] (9; CAS, CNC, UBC), Fort Nelson [Aug.] (3; CNC, UASM), Glenora (8; ANSP, CAS, ISUI, USNM), Golden [July] (3; ANSP, UASM), Goodrich Creek (12 mi. w. of Little Prairie) [June] (2; UASM), Hyland River (Alaska Highway mi. 605) [Aug.] (1; DHKa), Kicking Horse River (13 mi. w. of Field) [June] (19; USNM), Kootenay River (17 mi. n. of Kimberley) [Aug.] (1; UASM), Le Moray [July] (1; BFCa), Liard River (Alaska Highway mi. 491) [June] (1; UASM), Midday Valley (near Merritt) [Aug.] (1; UBC), Morrissey [July] (2; UWEM), Mount Robson Provincial Park ([1830m]) [July] (1; ANSP), Muskwa River (Alaska Highway mi. 296) [June] (13; CNC, UASM), Peace River (at Alaska Highway) [June] (1; UBC), Perow [June] (1; CNC), Pine Pass (Pine River) [Aug.] (1; MSU), Pouce Coupe [July] (1; BFCa), Princeton [May, July] (7; CNC, UBC), Racing River (Alaska Highway mi. 418.7) [June] (4; CNC, UASM), Sikanni Chief River (Alaska Highway mi. 160) [June] (14; CNC, UASM), Spious Creek [July] (2; INHS, UBC), Stikine River (1; USNM), Summit Lake (Alaska Highway mi. 392 [1280m]) [July] (4; CNC), Terrace (7 mi. e.) [June] (1; CNC), Tetsa River (Alaska Highway mi. 376, 378, and 383) [June, Aug.] (5; DHKa, LRus, UASM), Toad River (at Alaska Highway) (7; JVMA), Trout Creek (13 mi. n. of Smithers) [June] (1; UASM), Upper Liard River (Alaska Highway mi. 642.6) [June] (1; UASM). NORTHWEST TERRITORIES: District of Mackenzie, Great Slave Lake (at Hay River) [Aug.] (3; USNM). SASKATCHEWAN: Fort Walsh [July] (16; CNC, UASM). YUKON TERRITORY: Burwash Landing (5 mi. n.) [July] (1; WSU), Carcross [July] (1; CUIC), Dawson (14 mi. e. [400m]) [Aug.] (2; CNC), Duke River (Alaska Highway mi. 1098.5) [June] (1; UASM), Kluane Lake (Burwash Flats) [Sept.] (1; MSU), Swift River (Alaska Highway mi. 725 and 733)

[June, Aug.] (20; CNC, DHKa, UASM), Watson Lake [Aug.] (1; CNC).

UNITED STATES OF AMERICA

ALASKA: Chilkat River (15 mi. n. of Haines) [June] (1; MCZ), Copper Center [June-July] (2; UWBM), Little Boulder Creek (Haines Highway mi. 31.5) [June] (1; UASM), Tiekell River (Richardson Highway mi. 58) [Aug.] (3; MCZ, UASM). CALIFORNIA: Alpine Co., Markleeville Creek [Aug.] (17; CAS). COLORADO: (30; ANSP, CAS, INHS, KUSM, MCZ, MSU, USNM); Archuleta Co., East Fork San Juan River (3 mi. se. of Highway 160) [Aug.] (4; DHKa, EAMa), Upper San Juan River [Aug.] (2; MCZ); Boulder Co., Barker Reservoir (Barker Dam [2620m]) [July] (2; CARM), Beaver Creek ([2430m]) [July] (2; CARM), Caribou Bog [June] (1; CARM), Coal Creek ([2100m-2290m]) [July] (10; CARM, CAS, CUB), Crisman (Sixmile Creek [1890m]) [July] (1; CARM), Eldora (South Fork Middle Boulder Creek [2530m]) [July] (3; CARM), Lefthand Creek ([1980m-2380m], and 6.1 mi. wsw. of Highway 36 [2010m]) [July-Aug.] (22; CARM, CUB, DHKa), Lyons (Middle St. Vrain Creek [1950m]) [July] (1; CARM), Nederland (Boulder Creek [2380m-2440m]) [July] (6; CARM), Pinecliffe (3 mi. w. on South Boulder Creek) [Aug.] (7; DHKa), South Boulder Creek (near Gross Dam [2130m]) [July] (1; CARM), Ward ([2500m], and 5 mi. e. on Lefthand Creek) [July-Aug.] (26; CARM, DHKa), Wondervu (near Cripple Creek) [July] (3; CARM); Chaffee Co., Nathrop (Chalk Creek, and 3 mi. n.) [Aug.] (6; CDA, GRNo, UWBM), Poncha Springs (5 mi. s.) [Aug.] (1; GRNo); Clear Creek Co., Empire (Clear Creek) [Sept.] (1; LRus), Georgetown (and Georgetown Reservoir [2740m]) [June-July] (7; CAS, DHKa, USNM), Graymont (Clear Creek) [July] (1; DHKa), Leavenworth Valley ([2740m-3050m]) [June-July] (2; AMNH, MCZ), Silver Plume ([2740m-3050m]) [June] (5; CAS,

MCZ, UMMZ); Conejos Co., Conejos River (16 mi. w. of Antonito [2650m]) [June] (11; DHKa); Costilla Co., El Pozo [June] (2; OSUO), Fort Garland [June, Aug.] (36; ANSP, CAS, KSUC, MCZ, MSU, PURC, UMMZ, USNM); Custer Co., Hardscrabble Creek (at Smith Creek [2270m]) [June] (8; DHKa), Wetmore (10 mi. s.) [Aug.] (1; USNM); Dolores Co., Rico area ([2590m-3050m], and Scotch Creek [2680m]) [July] (7; CAS, CNC, KUSM, MCZ); Douglas Co., Sedalia (3 mi. e. at Plum Creek) [May] (2; DHKa); Eagle Co., Gypsum (Eagle River) [Aug.] (5; USNM), Vail (5.0 mi. e. at Gore Creek [2740m]) [July] (1; USNM); El Paso Co., Colorado Springs (1; INHS), Fountain Creek (at Highway 29 [1830m]) [June] (9; DHKa, EAMa), Manitou Springs [June] (2; CAS); Fremont Co., Cañon City [June] (2; USNM), Wellville (Arkansas River [2120m]) [June] (72; DHKa); Gilpin Co., East Portal area (South Boulder Creek [2740m]) [July] (7; CArm), Rollinsville (South Boulder Creek [2440m-2530m], and 2.5 mi. w.) [July-Aug.] (12; CArm, DHKa, UAFA); Grand Co., Granby (Fraser River) [Aug.] (2; USNM); Gunnison Co., [Aug.] (5; MCZ), Gunnison [June, Aug.] (5; OSUC, USNM); Hinsdale Co., Lake City [June] (1; KUSM); Huerfano Co., La Veda (and 5 mi. s. at Cucharas River [2320m]) [June-July] (9; DHKa, USNM), North La Veda Pass (east side [2530m]) [June] (7; DHKa, EAMa); Jefferson Co., Bear Creek [Sept.] (4; UWBM), Denver (18 mi. sw.) [Aug.] (3; GRNo), Evergreen (Bear Creek) [Sept.] (1; DHKa), Golden (and 1 mi. w. on Clear Creek [1770m]) [May-June, Aug.-Sept.] (143; DHKa, EAMa, USNM), Morrison (2 mi. e. on Bear Creek) [Oct.] (8; DHKa, SJSC, USNM), Tinytown (1 mi. n.) [Aug.] (3; CDA), Waterton (South Platte River) [July] (4; DHKa); Lake Co., Climax (3.8 mi. sw. [3050m-3350m]) [Aug.] (12; UAFA), Independence Pass area ([3660m], and 5.1 mi. e.) [Aug.] (6; UAFA), Leadville ([3050m-3350m]) [June-July] (18; CAS, DEUN), Twin

Lakes (Lake Creek) [June, Aug.] (2; CAS, DHKa); La Plata Co., Durango area ([1680m-2130m]) [July-Aug.] (1; MCZ), Gold King Mill (Tirbircio Creek [2830m]) [Aug.] (6; UASM), Junction Creek [July] (1; USNM), Rockwood [July] (1; KUSM); Larimer Co., Bennett Creek [July] (2; RTBe), Buckhorn Creek [July] (6; RTBe), Crown Point Road (at Bennett Springs [2350m], 4.0 mi. sw. of highway junction [2290m]) [Aug.] (9; DHKa, UASM), Fort Collins area ([2440m]) [July-Aug.] (6; CAS, CDA, GRNo, ICCM), Kelly Flats (Cache La Poudre River) [Aug.] (3; RTBe), Laporte (2 mi. w. and 6 mi. nw. on Cache La Poudre River) [May, Aug.] (65; CDA, DHKa, EAMa), Sheep Creek [Aug.] (1; RTBe); Los Animas Co., Cucharas Pass (5 mi. s. at Bear Creek [2800m]) [June] (3; DHKa), Stonewall Gap (Middle Fork Purgatoire River [2500m]) [June] (4; DHKa), Weston (4.4 mi. e. at Purgatoire River [2130m]) [June] (4; DHKa); Mineral Co., Big Meadows Reservoir (8 mi. n. of Wolf Creek Pass [2650m]) [July] (4; CNC), Creede ([2740m]) [July] (2; MCZ), South Fork (4 mi. w. on Rio Grande River) [Aug.] (1; DHKa); Moffat Co., Dinosaur National Monument (Green River) [May] (2; MSU); Ouray Co., Ouray area ([2290m-3050m]) [June-July] (43; AMNH, ANSP, CAS, KSUC, MCZ, UMMZ, USNM); Park Co., Alma (Middle Fork South Platte River [3140m]) [July] (10; CAS, DHKa, EAMa), Bailey (North Fork South Platte River) [Aug.] (9; USNM), Como (5 mi. w. on Tarryall Creek [3200m]) [July] (11; DHKa, EAMa), Deer Creek [June] (1; USNM), Fairplay (South Platte River) [Aug.] (1; USNM), South Platte River Middle Fork([3510m]) [July] (2; DHKa), Kenosha Pass ([3050m]) [July] (26; CAS, FMNH, MCZ, UCD, UMRM), Santa Maria (and 0.7 mi. e. on North Fork South Platte River [2290m]) [June] (64; DHKa, USNM); Pitkin Co., Aspen [July] (1; CUIC); Rio Blanco Co., Buford (3 mi. ne. on North Fork White River [2160m]) [Aug.] (26; DHKa); Rio Grande Co., Monte

Vista [Aug.] (2; UMMZ), South Fork (1 mi. e. on Rio Grande River, 2 mi. sw.) [Aug.-Sept.] (8; CDA, DHKa); Rocky Mountain National Park, Fall River ([2440m]) [Aug.] (18; UASM); Routt Co., Clark [July] (1; CAS); San Juan Co., Silverton area ([3050m]) [Aug.] (1; MCZ); San Miguel Co., South Fork San Miguel River ([2590m]) [July] (21; AMNH, ICCM, KUSM, MCZ, UMRM, USNM), Trout Lake (Rico Road [2590m-3050m]) [July] (3; MCZ, USNM); Summit Co., Frisco (Termile Creek) [Aug.] (2; RDay), Snake River (near Dillon Reservoir) [Aug.] (1; USNM); Teller Co., Florissant [June] (16; MCZ, PADA), Phantom Canyon ([2960m]) [Oct.] (1; CAS); County unknown, Bendimeer [July] (11; CAS), Douglas Pass ([2500m]) [Aug.] (1; MCZ), Evergreen Lakes [Aug.] (4; MCZ), Monument Gulch ([2130m-2740m]) [July] (1; CAS), North Fork South Platte River ([2130m-2440m]) [Aug.] (1; MCZ), San Luis Valley ([2350m]) [Aug.] (2; CAS, MCZ), Thayer (1; KSUC). IDAHO: (2; KSUC); Ada Co., Boise (2; UMMZ); Blaine Co., North Fork Warm Springs Creek (10 mi. w. of Ketchum [1890m]) [Aug.] (2; DHKa), Sun Valley [Sept.] (3; JSch); Boise Co., Crouch area (South Fork Payette River [910m]) [Aug.] (5; RTBe), Lowman [July] (1; BFCa); Camas Co., Carrie Creek (36 mi. wsw. of Ketchum [2100m]) [Aug.] (2; DHKa), Skeleton Creek (14 mi. e. of Featherville [1550m]) [Aug.] (3; DHKa), South Fork Boise River (at Bear Creek [1830m]) [Aug.] (1; DHKa); Cassia Co., Rock Creek Canyon (15 mi. s. of Rock Creek) [June] (9; UIMI); Custer Co., Challis (9 mi. n.) [Sept.] (2; UIMI), Rothas (8 mi. ne. at Pass Creek [1980m]) [Aug.] (1; DHKa), Salmon River (at Bayhorse Creek [1620m], 12 mi. n. of Challis) [July-Aug.] (12; DHKa, UWEM), Summit Creek (9 mi. ne. of Trail Creek Summit [2130m]) [Aug.] (5; DHKa); Elmore Co., Pine (3 mi. n. on South Fork Boise River at Dog Creek Campground [1460m]) [Aug.] (23; DHKa); Nez Perce Co.,

Lewiston [May] (8; UIMI, UWEM); Twin Falls Co., Magic Hot Springs
 [July] (4; FMNH, UWEM); Valley Co., Payette Lake [Aug.] (1; NMDo);
 Washington Co., Weiser [Oct.] (11; USNM). MONTANA: Big Horn Co.,
 Hardin (2 mi. se. at Bighorn River [940m]) [July] (126; DHKa), Wyola
 (9 mi. se. at Little Bighorn River [1280m]) [July] (26; DHKa); Carbon
 Co., Bridger (Clarks Fork at Highway 310) [Sept.] (1; UASM); Cascade
 Co., Belt (Little Belt Creek [1100m]) [July] (19; DHKa), Belt Creek
 (at Highway 87) [June] (2; DJLa, RFre), Sun River (on Sun River at
 Highway 200 [1010m]) [July] (1; DHKa); Chouteau Co., Highwood Creek
 (26 mi. ne. of Belt [1310m]) [July] (41; DHKa), Loma (Marias River)
 [June] (1; UASM), North Fork Highwood Creek (at Briggs Creek [1370m])
 [July] (34; DHKa), South Fork Highwood Creek (at Big Coulee [1490m])
 [July] (14; DHKa); Flathead Co., Flathead Lake [Aug.] (1; USNM),
 Kalispell [June] (1; USNM), North Fork Flathead River (at Middle Fork
 Flathead River) [Aug.] (1; OSUO), West Glacier (Middle Fork Flathead
 River) [July] (2; DHKa); Gallatin Co., Bozeman ([1430m]) [Aug., Oct.]
 (4; DZEC, LRus), Cabin Creek (at Madison River) [July] (1; ICCM),
 Madison River (25 mi. sw. of Bozeman) [June] (1; MSU), Manhattan
 ([1430m]) [Aug.] (3; LRus); Glacier Co., Cut Bank Creek (n. of
 Browning) [July] (3; UASM); Glacier National Park, St. Mary entrance
 [July] (2; SJSC), West Glacier entrance [Aug.] (1; SJSC); Judith Basin
 Co., Hobson (0.2 mi. nw. at Judith River [1280m]) [July] (8; DHKa);
 Lewis and Clark Co., Helena [Aug.] (1; USNM); Lincoln Co., Troy (at
 Kootenai River [550m]) [July-Aug.] (3; CUIC, LRus), Yaak River (at
 Kootenai River) [Aug.] (1; MSU); Mineral Co., Alberton ([910m]) [Aug.]
 (7; LRus); Powell Co., Lincoln (10 mi. w. [1130m]) [July] (2; LRus);
 Ravalli Co., Hamilton [Sept.] (1; UIMI); Sanders Co., St. Regis (12 to

13 mi. ne. [760m]) [June-July] (2; LRus); Teton Co., Dutton (5 mi. n. at Teton River [1070m]) [July] (5; DHKa); Toole Co., Marias River [Sept.] (3; CNC), Shelby (6 mi. s. at Marias River [980m]) [July, Sept.] (11; DHKa, UASM); Yellowstone Co., Billings (Yellowstone River at Highway 87 [980m]) [July] (8; DHKa), Laurel (Yellowstone River at Highway 310) [Sept.] (2; DHKa, UASM). NEBRASKA: Sioux Co., Glen [Aug.] (1; DEUN). NEVADA: (3; ANSP); Elko Co., Contact [Aug.] (1; BFCa), Lamoille Creek (at Lower Lamoille Campground [1920m]) [Aug.] (3; DHKa), Wildhorse Dam (0.1 mi. nw. on Owyhee River [1870m]) [Aug.] (17; DHKa); Nye Co., Reese River (0.3 mi. s. of Reese River Ranger Station [2090m]) [July] (12; DHKa). NEW MEXICO: (6; ANSP, LACM, MCZ, UMRM); Mora Co., Gascon (2 mi. w. at Rio de Gascon [2440m]) [Aug.] (6; UASM); Rio Arriba Co., Canjilon (9.5 mi. ne. at Canjilon Creek [2770m]) [June] (1; DHKa), Cañones Creek (at Highway 96 [2010m]) [June] (4; DHKa), Rio Puerco (at Rio Puerco Campground [2350m-2440m]) [June] (1; DHKa), Rio San Antonio (14 mi. e. of Lagunitas [2730m]) [June] (5; DHKa), Rio Tusas (at Highway 553 [2730m]) [June] (3; DHKa); Sandoval Co., Rio de Las Vacas (at Highway 126 [2480m]) [June] (2; DHKa); San Miguel Co., Beaver Creek (sw. of Rincon Montoso [2620m]) [Aug.] (1; UASM), Cowles ([2440m], and 2.0 mi. n. on Panchuela Creek at Panchuela Campground [2530m]) [June] (57; DHKa, UASM), Gallinas (5.5 mi. w. [2260m-2440m]) [June, Aug.] (39; UASM), Holy Ghost Canyon (14 mi. n. of Pecos [2440m]) [June] (8; UASM), Jack's Creek (at Pecos River [2480m]) [June] (4; DHKa), Pecos (0.5 mi. n. [2090m] and 9.9 mi. n. at Windy Bridge [2260m] on Pecos River) [June] (50; DHKa), Rio Moro (at Pecos River [2410m]) [June] (33; DHKa), Sapello (15.7 mi. w. at Mosimann Ranch [2440m]) [June] (5; UASM), Tererro

(3.0 mi. w. at Holy Ghost Creek [2480m]) [June] (4; DHKa), Upper Pecos River [June] (4; CAS), Winsor Creek ([2560m-2590m]) [June] (4; DHKa); Santa Fe Co., Black Cañon Campground ([2590m]) [Aug.] (1; RCGr), Santa Fe (Santa Fe Cañon [2130m]) [June-Aug.] (29; CAS, KSUC, KUSM); Taos Co., Angostura Creek (0.3 mi. s. of Highway 3 [2710m]) [June] (8; DHKa), Questa (2.0 mi. e. on Red River [2330m]) [June] (52; DHKa), Red River (2.4 mi. se. [2730m], 8.0 mi. s. [2870m], 2.2 mi. w. at June Bug Campground [2610m], and 4.1 mi. w. [2580m] on Red River) [June] (182; DHKa), Rio Pueblo (1.7 mi. [2390m] and 5.4 mi. [2510m] e. of junction of Highways 3 and 3/75) [June] (26; DHKa), Shady Brook (2.0 mi. e. at Rio Fernando de Taos [2440m]) [June] (4; DHKa), Tres Ritos [July] (8; CAS, CNC). OREGON: Baker Co., North Powder River (10 mi. nw. of Haines [1040m]) [May] (4; DHKa); Crook Co., Ochoco Creek (14 mi. e. of Prineville [1020m]) [May] (1; DHKa); Grant Co., Dale (2.4 mi. s. at Meadow Brook [1050m]) [May] (4; DHKa), Mount Vernon (1.5 mi. e. on John Day River [940m]) [May] (3; DHKa), Prairie City (John Day River) [Sept.] (5; JSch); Lake Co., Adel (5 mi. sw.) [June] (1; JSch); Malheur Co., Farewell Bend State Park [Sept.] (1; UASM); Umatilla Co., Dale (1 mi. n. at North Fork John Day River [910m]) [May] (5; DHKa), Echo (Umatilla River [290m]) [May] (1; DHKa), Freewater [Sept.] (3; OSUO, USNM), Rieth (5.9 mi. w. at Umatilla River [370m]) [May] (1; DHKa); Wallowa Co., Minam [May] (2; UWEM); Wasco Co., Tygh Creek (at Highway 197) [June] (1; JSch). SOUTH DAKOTA: Custer Co., Custer (2 mi. s.) [Aug.] (2; UASM), Sylvan Lake [Aug.] (1; DHKa); Fall River Co., Hot Springs [Sept.] (1; VMKi); Lawrence Co., Cheyenne Crossing (2.2 mi. se. at East Fork Spearfish Creek [1830m]) [July] (3; DHKa), Nemo [Aug.] (1; UMMZ), Spearfish (and 5 mi. [1340m] and 10 mi. [1520m] ssw. at

Spearfish Creek) [July-Sept.] (63; DHKa, VMKi); Pennington Co., Hill
 City (Castle Creek [1460m]) [July] (8; DHKa), Rochford (2 mi. ese. at
 Rapid Creek [1570m]) [July] (29; DHKa); County unknown, Palmer Creek
 [Aug.] (8; MSU). UTAH: (1; ANSP); Beaver Co., ([2440m-3050m]) [Aug.]
 (2; CAS, USNM), Beaver (and 4.1 mi. e. on Beaver River at Little
 Cottonwood Campground [2100m]) [June, Aug.] (4; BFCa, DHKa), North
 Creek [July] (5; CAS, MCZ, USNM); Cache Co., Logan [June-July] (4; CAS,
 EMUS), Providence [Aug.] (1; EMUS); Garfield Co., Antimony (8 mi. s.
 on Sevier River) [July] (9; UAFA), Hatch [Aug.] (2; BFCa), Panguitch
 (2.5 mi. se. on Sevier River [2010m]) [July] (32; DHKa), Sevier River
 (at Highway 12) [July] (5; UASM); Iron Co., Parowan (and 2.7 mi. s. on
 Parowan Creek [1920m]) [June-July] (44; DHKa, USNM), Vermillion Castle
 Campground [July] (2; UMI); Kane Co., Glendale (4.9 mi. [1860m] and
 6.0 mi. [1890m] ne. at East Fork Virgin River, 21.6 mi. n. on Highway
 89 [1920m]) [June, Aug.] (30; DHKa, UASM); Millard Co., Fillmore [Aug.]
 (2; CNC); Morgan Co., Mountain Green (Weber River [1510m]) [Aug.]
 (12; DHKa); Piute Co., Kingston (9 mi. e. at East Fork Sevier River
 [2350m]) [June] (3; DHKa), Marysvale (2.2 mi. w. at Beaver Creek
 [1830m]) [July] (2; DHKa); Summit Co., East Fork Bear River (31.1 mi.
 s. of Evanston [Wyoming] [2500m]) [Aug.] (7; DHKa), Kamas (5.2 mi. e.
 at Beaver Creek [2130m]) [Aug.] (1; DHKa), North Fork Provo River (at
 Highway 150) [Aug.] (1; USNM), North Fork Upper Provo River (12.5 mi.
 [2300m] and 15.8 mi. [2390m] e. of Kamas) [Aug.] (4; DHKa); Utah Co.,
 American Fork Canyon [June] (26; ANSP, CAS, INHS, USNM), Provo [June]
 (1; USNM), Provo River (at Upper Falls [1570m]) [Aug.] (1; DHKa);
 Wasatch Co., Daniels Creek (near Heber) [Aug.] (3; UASM), Deer Creek
 Reservoir [Aug.] (1; BFCa), Hailstone Junction (3.4 mi. e. on Upper

Provo River [1890m]) [Aug.] (4; DHKa), Provo River (12.2 mi. ne. of Provo [1630m]) [Aug.] (1; DHKa); Wayne Co., Capitol Reef National Monument (2.1 mi. e. of Capitol Reef Lodge on Fremont River [1710m]) [Aug.] (2; DHKa); Weber Co., Ogden [July] (4; USNM). WASHINGTON: (5; MCZ, USNM, WSU); Asotin Co., Asotin (Asotin Creek [370m]) [May] (1; DHKa); Benton Co., Hanford [Apr.-May] (3; UWBM), Kennewick [Sept.] (1; UWBM), Richland [Apr.-May] (11; FMNH, UWBM); Chelan Co., Cashmere [July-Aug.] (5; CAS, UWBM), Leavenworth [July] (8; AMNH, MCZ, UCR, USNM), Wenatchee [Aug.] (3; UWBM); Columbia Co., Dayton [Sept.] (3; CUTIC); Franklin Co., Pasco [May] (22; MCZ, UWBM), Perry [Aug.] (1; USNM); Kittitas Co., Cle Elum [June-July] (46; UWBM), Easton (2; CAS, USNM), Ellensburg [May-July, Sept.] (10; CAS, CNC, FMNH, UWBM), Swauk Creek [June] (1; UWBM), Thorp [May] (37; LRus, UWBM), Vantage [May] (4; UWBM); Okanogan Co., Nine Mile [Sept.] (1; LACM); Skamania Co., Stevenson (1; UWBM); Walla Walla Co., Burbank [May] (1; WSU), Snake River (at Columbia River) [Aug.] (2; CAS), Touchet River (near Waitsburg) [July] (8; DJLa), Walla Walla (2 mi. s. at Walla Walla River [320m]) [May] (3; DHKa); Whitman Co., Central Ferry (Snake River) [Aug.-Sept.] (2; UWBM), Pullman [Apr.-May] (2; WSU), Wawawai [May] (1; JSch); Yakima Co., Cliffdell (4.3 mi. se. on Naches River [730m]) [July] (2; DHKa), Naches [July, Sept.] (74; KUSM, UWBM), Naches River (and at Tieton River [560m]) [July-Aug.] (47; DHKa, USNM), Yakima [May, Sept.] (7; JSch, USNM, WSU); County unknown, East Bar [Apr.] (1; USNM). WYOMING: (1; USNM); Albany Co., Keystone (1 mi. sse. at Douglas Creek [2680m], 5 mi. sse. at Lake Creek [2620m]) [July] (31; DHKa), Woods Landing (Laramie River [2290m]) [July] (26; DHKa); Carbon Co., Medicine Bow (4 mi. n. at Little Medicine Bow River) [Aug.] (1; RCGr), Riverside

(Encampment River [2180m]) [July] (26; DHKa); Converse Co., Horseshoe Creek (34 mi. s. of Douglas [1890m]) [July] (22; DHKa); Fremont Co., Fort Washakie (Little Wind River) [Aug.] (11; EAMa), Wind River (38.8 mi. e. of Moran Junction [2290m]) [June] (1; RFre); Grand Teton National Park [July] (4; CAS), Colter Bay Campground [July] (1; CUIC); Johnson Co., Clear Creek (12 mi. w. of Buffalo [2190m]) [July] (18; DHKa); Lincoln Co., Greys River (15 mi. se. of Alpine Junction at Murphy Creek [1920m]) [July] (21; DHKa), Salt Creek (12.5 mi. ne. of Geneva [2060m]) [Aug.] (3; DHKa), White Creek (20 mi. se. of Alpine Junction [2190m]) [July] (3; DHKa); Park Co., Cody (and at Morris Ranch [2040m]) [July, Sept.] (2; ANSP, CUIC); Platte Co., Bluegrass Creek (36 mi. ne. of Bosler [1620m]) [July] (6; DHKa); Sheridan Co., Dayton (Tongue River [1190m]) [July] (2; DHKa), Piney Creek (19 mi. ssw. of Sheridan [1370m]) [July] (30; DHKa); Sublette Co., Battle Mountain (0.5 mi. s. on Hoback River) [Aug.] (17; EAMa), Big Sandy (4.5 mi. nw. at East Fork River [2190m]) [July] (7; DHKa), Bondurant (8 mi. nw. on Hoback River [2100m]) [July-Aug.] (74; DHKa), Boulder Creek (15 mi. ne. of Boulder [2260m]) [July] (7; DHKa), Green River (39 mi. nnw. of Pinedale at Whiskey Grove Campground [2320m]) [July] (1; DHKa), Hoback River (14 mi. sw. of Highway 187/189 [2440m]) [July] (38; DHKa), Pinedale (Pine Creek [2180m]) [July-Aug.] (2; DHKa, MSU), Pole Creek (at Highway 187/189, 6 mi. se. of Pinedale [2160m]) [July-Aug.] (2; DHKa, EAMa); Sweetwater Co., Farson (Little Sandy River [Sept.] (1; UASM), Green River ([1830m-2130m]) [July-Aug.] (12; CAS, KUSM, MCZ, MSU, USNM); Teton Co., Granite Creek (at Little Granite Creek [2150m]) [Aug.] (4; DHKa), Togwotee Pass (3.7 mi. wnw. at Blackrock Creek [2770m]) [Aug.] (8; DHKa); Washakie Co., Tensleep Creek (11 mi. [1890m] and 16.6 mi.

[1550m] ne. of Tensleep) [July] (15; DHKa); Yellowstone National Park [July-Aug.] (17; AMNH, INHS, USNM), Astringent Creek [July] (1; UCB), Gardner River (and at Mammoth Hot Springs) [Aug.-Sept.] (24; JSch, NMDo, UWBM), Norris Geyser Basin ([2130m]) [May-June, Aug.] (12; LRus, UASM, UMMZ), Slough Creek [Aug.] (1; SJSC), The Thumb [June] (9; CAS), Upper Geyser Basin [July] (5; USNM); County unknown, Tie Hack Campground [Aug.] (4; SJSC, USNM).

Doubtful Records. CANADA, BRITISH COLUMBIA: Vancouver Island, Campbell River [Aug.] (7; CAS, CNC). ONTARIO: Middlesex Co., Lobo Township [Aug.] (3; UASM). UNITED STATES OF AMERICA, INDIANA: (1; USNM). NEBRASKA: Lancaster Co., Lincoln [Apr.] (1; CAS). TEXAS: (1; USNM). WASHINGTON: King Co., Seattle (1; KSUC).
No Data. (1; CDA).

Nebria ovipennis LeConte

Map: Figure 404

Specimens examined: 269 (127♂, 142♀)

UNITED STATES OF AMERICA

CALIFORNIA: (3; ANSP, CAS); Alpine Co., Ebbetts Pass ([2670m]) [June] (1; MCZ); El Dorado Co., (3; CAS), Glen Alpine [July] (2; CAS, USNM), Pyramid Peak ([2440m]) [Aug.] (2; CAS), Strawberry Valley [Aug.] (5; CAS), Tallac [July] (11; AMNH, CAS, KSUC, LACM, UMRM); Fresno Co., Kaiser Peak ([3050m]) [July] (1; CAS), Piute Creek ([3020m]) [Aug.] (1; CAS), Snow Bend Creek (near Kaiser Pass) [Aug.] (11; CAS, DHKa); Inyo Co., Big Pine Creek (near Willow Lake [2930m]) [Aug.] (1; CAS); Kings

Canyon National Park, Bubbs Creek Canyon ([3050m]) [July] (1; CAS),
 Bullfrog Lake ([3230m]) [July] (8; CAS, UWRM), Kearsarge Lakes
 ([3510m]) [July] (2; CAS), North Fork Woods Creek [Sept.] (9; CAS,
 CNC, MCZ), Sixty Lake Basin ([3200m]) [July] (1; CAS); Mono Co., H. M.
 Hall Natural Area ([3050m-3350m]) [July-Sept.] (4; RPPa), Leavitt
 Meadows [Aug.] (1; UCB), Mill Creek (above Lundy [2740m-3350m]) [July-
 Aug.] (10; CAS, USNM), Mount Conness (falls above Greenstone Lake)
 [July] (17; DHKa), Saddlebag Lake [Sept.] (2; CAS), Slate Creek Basin
 (North Branch Slate Creek [3100m-3320m]) [July] (9; DHKa), Sonora Pass
 (and 1.0 mi. e.) [June, Aug.] (2; DHKa, UCB), White Mountain (east slope
 between Green Treble Lake and Big Horn Lake [3110m-3260m]) [July] (3;
 DHKa); Placer Co., [May-June, Sept.] (31; CAS, FMNH, ICCM, KUSM, USNM),
 Deer Park (Alpine Meadows Ski Area) (1; CAS), Donner Summit [June-July]
 (3; CAS); Sequoia National Park, Mount Sillman ([3050m]) [Aug.-Sept.]
 (3; CAS, OSUC, USNM); Sierra Co., Yuba Pass (2.2 mi. s. at Berry Creek
 [2040m]) [July] (2; CAS, DHKa); Tulare Co., [Sept.] (2; KUSM), Farewell
 Gap ([3050m]) [Aug.] (4; CAS), Franklin Lakes ([3050m-3140m]) [July,
 Sept.] (20; CAS, CNC, DHKa, KUSM, MCZ, UASM), Mineral King [Aug.] (5;
 CAS), Monarch Lake [Sept.] (2; CAS, INHS); Tuolumne Co., Chipmunk Flat
 [Aug.] (6; UCD, USNM), Sonora Pass ([2740m-3350m] and 2 mi. w.) [June-
 Sept.] (30; CAS, CDA, DHKa, UCB, UCD, UIMI, USNM); Yosemite National
 Park, Donahue Pass ([3050m-3350m]) [Aug.] (2; RTBe), Elizabeth Lake
 [3200m-3350m]) [Aug.] (4; CAS, RTBe), Lyell Fork Tuolumne River (John
 Muir Trail [2990m]) [Sept.] (12; DHKa), Mount Dana [Sept.] (2; CAS),
 Mount Lyell ([3350m]) [July] (6; CAS), Tilden Lake [July] (1; CAS),
 Tuolumne Meadows ([2820m]) [July-Aug.] (6; CAS, MCZ, UMMZ); County

unknown, Sierra Nevada (1; MCZ). NEVADA: Washoe Co., Mount Rose (east slope, 0.5 mi. e. of Mount Rose Pass on Brown Creek [2690m], 11 mi. w. of Highway 395 at Galena Creek [2290m]) [July-Aug.] (15; CAS, DHKa, WSU).

Doubtful Records. UNITED STATES OF AMERICA, OREGON: Lane Co., Eugene [May] (1; MCZ).

Nebria pallipes Say

Map: Figure 396

Specimens examined: 2069 (1063♂, 1006♀)

CANADA

NEW BRUNSWICK: [Aug.] (2; MCZ); Albert Co., West River [Aug.] (8; CUIC); Kings Co., Grand Bay [July] (2; DJLa); York Co., Tay River (near Taymouth) [July] (16; DJLa). NOVA SCOTIA: Colchester Co., Truro [June, Aug.] (6; CAS, CUIC). ONTARIO: Carleton Co., Ottawa [June-July] (6; ALar, HGou, USNM). QUÉBEC: Cté d'Abitibi, Stem [Aug.] (9; HGou, USNM); Cté d'Arthabaska, St-Louis-de-Blandford [Sept.] (1; ALar); Cté de Berthier, Berthierville [July-Sept.] (19; ALar, DBUM), Lanoraie [June] (3; CNC); Cté de Beauharnois, Beauharnois [Sept.] (1; DBUM), Cté de Bonaventure, Escuminac [July] (18; ALar), Matapédia [July] (2; ALar), Nouvelle [July] (6; ALar); Cté de Brome, Brome [Aug.] (3; CNC), Knowlton (and 5 mi. se.) [June-Aug.] (11; CNC, UASM), Orford Lake [Aug.] (1; CPQC); Cté de Champlain, Ste-Thècle (Lac Long) [July] (1; CPQC); Cté de Charlevoix-Ouest, Île-aux-Coudres [Aug.] (1; CNC); Cté de Chicoutimi, St-Ambroise [June] (4; ALar); Cté de Frontenac, Lac-Mégantic [Aug.]

(1; CPQC); Cté de Joliette, Joliette [July-Aug.] (8; ALar, CNC, DBUM, KJSM), Ste-Melanie [July] (16; ALar, CNC); Cté de Levis, St-Nicolas [July] (1; CDA); Cté de Lotbinière, St-Sylvestre [Aug.] (2; ALar, CDA), Val-Alain [Sept.] (1; ALar); Cté de Montcalm, Rawdon [Aug.] (1; DBUM), St-Émile-de-Montcalm [Aug.] (6; ALar, CNC); Cté de Nicolet, Becancour [Sept.] (5; ALar, CDA, LRus); Cté de Portneuf, Rivière-à-Pierre [Aug.] (1; LRus), Ste-Catherine [Aug.] (1; ALar), St-Léonard-de-Portneuf [Sept.] (1; ALar); Cté de Richelieu, St-Ours [Aug.] (3; ALar, LRus); Cté de Rouville, Mont Yamaska [Aug.] (1; LRus); Cté de Standstead, Ayer's Cliff [July] (18; ALar, CNC), Coaticook [Sept.] (1; CPQC), Lake-Memphrémagog [June] (4; MCZ); Cté de Vaudreuil, Choisey [Sept.] (9; ALar, CNC), Rigaud [Aug.-Sept.] (5; ALar, HGou); Île-de-Montréal, Montréal [May, Oct.] (2; CPQC, DBUM); County unknown, Ste-Marguerite [Aug.] (1; ALar), St-Hilaire (1; UASM).

UNITED STATES OF AMERICA

CONNECTICUT: (1; AMNH); Fairfield Co., Shelton [June] (3; MCZ); Hartford Co., Burlington [Aug.] (1; UMMZ), Hartford (10; PMNH), Plantsville (1; PMNH); Litchfield Co., Cornwall [May-Aug.] (5; CUIC, LACM), Kent [June] (1; CUIC), Litchfield [June-July] (22; AMNH, CUIC, LACM); Middlesex Co., Durham [Aug.] (1; LACM), Rockfall [Oct.] (1; MCZ); New Haven Co., Meriden (south) [Sept.] (1; DENH), Mount Carmel [June] (1; PMNH), New Haven [Oct.] (1; PADA); Tolland Co., Union [June] (3; UMMZ); Windham Co., Pomfret (2; AMNH, MCZ). DISTRICT OF COLUMBIA: [July] (1; USNM); Washington (and Glover Archbold Park, Pimmit River, Rock Creek Park) [May-June, Aug.-Sept., Nov.] (20; MCZ, USNM). ILLINOIS: (3; INHS, MCZ); Champaign Co., Champaign [Oct.] (1; UBC); Coles Co.,

Fox Ridge State Park [Oct.] (4; RTBe); La Salle Co., Starved Rock State
 Park [Aug.] (11; CSU, RTBe); Peoria Co., Peoria [June] (1; FMNH);
 Vermillion Co., Danville (Harrison Park) [July] (1; RTBe), Kickapoo
 State Park [Sept.-Oct.] (7; RTBe). INDIANA: (3; AMNH, INHS); Allen
 Co., [Sept.] (1; UMMZ); Clark Co., Clark County State Forest and Nursery
 [June] (2; PURC); Fountain Co., [May] (1; NMDo); Franklin Co., [June] (1;
 PURC); Lawrence Co., Spring Hill State Park [Aug.] (2; SJSC); Marion
 Co., [Sept.] (1; PURC); Monroe Co., Belmont area [Oct.] (2; IUIC),
 Bloomington [May, Oct.] (2; IUIC); Morgan Co., [June] (2; PURC);
 Montgomery Co., Shades State Park [Sept.-Oct.] (3; NMDo, RTBe); Parke
 Co., Turkey Run State Park [June] (2; INHS, UCD); Tippecanoe Co., [Oct.]
 (3; UMMZ), Lafayette [May, Oct.] (2; PURC, UMMZ). KENTUCKY: (1; MCZ);
 Jessamine Co., Marble Creek (at Kentucky River [200m]) [May] (15; DHKa);
 Mammoth Cave National Park [Aug., Oct.-Nov.] (10; MCZ, RTBe, UWEM);
 Powell Co., Natural Bridge State Park [Aug.] (8; CNC); Wolfe Co., [June]
 (4; MCZ). MAINE: Aroostook Co., Allagash area [Aug.] (4; MCZ);
 Franklin Co., Weld [Sept.] (3; CUIC); Hancock Co., Lamoine (1; MCZ);
 Kennebec Co., Monmouth [June] (1; MCZ); Oxford Co., Bethel (1; MCZ),
 Paris [Sept.] (1; SJSC); Penobscot Co., East Branch Penobscot River (at
 Lunksoos) [July] (1; MCZ); Piscataquis Co., Greenville [Aug.] (1; MCZ).
 MARYLAND: (2; MCZ); Anne Arundel Co., Odenton [June] (4; CUIC);
 Baltimore Co., [July] (2; CNC), Baltimore [May-June, Aug.-Sept.] (10;
 CAS, DHKa, USNM), Homewood [May] (1; USNM), Hereford [Aug.] (3; USNM),
 Parkton [July] (1; USNM); Frederick Co., Buckeystown [Aug.] (1; RTBe),
 Frederick (and Old Mink Farm Camp, Monocacy River at Linganore Creek)
 [May-June, Aug.] (7; GRNo, RTBe, USNM); Harford Co., Franklinville

(Gun Powder River) [Aug.] (15; USNM); Montgomery Co., [Sept.] (1; USNM), Cabin John [Sept.-Oct.] (17; USNM), Plummers Island (adjacent to) [Oct.] (15; USNM); Prince George Co., Branchville [May] (1; USNM), Laurel (1; CUIIC); Washington Co., Boonesboro (1 mi. s.) [Oct.] (1; USNM); County unknown, Prettyboy Reservoir [May] (2; USNM).

MASSACHUSETTS: (10; AMNH, DHKa, MCZ); Berkshire Co., Mount Washington [July] (1; UMI), Tyringham (2; MCZ); Franklin Co., Mount Toby [Sept.] (1; MCZ), Northfield [Aug.] (2; CNC, MCZ); Hampden Co., Montgomery [Aug.] (1; USNM); Hampshire Co., Amherst [Sept.] (1; JSch), Cummington [July] (1; USNM), Hadley [Sept.] (1; CAS); Middlesex Co., Bedford Center (0.1 mi. e. at Bedford Reservoir [30m]) [June, Aug.] (6; DHKa, USNM), Dunstable (Salmon Brook) [Sept.] (2; PSMi), Framingham [June] (2; UMMZ), Natick [Sept.] (1; UASM), Stoneham [Oct.] (1; CAS); Norfolk Co., Needham [Oct.] (4; MCZ); Worcester Co., Barre [June] (7; UASM), East Northboro [July] (1; MCZ). MICHIGAN: Chippewa Co., Whitefish Point [July] (1; UMMZ); Oakland Co., [Aug.] (2; UMMZ), Southfield [Sept.] (2; UMMZ); Wayne Co., Detroit [Apr.] (2; UMMZ). NEW HAMPSHIRE: Belknap Co., Center Harbor [July] (5; AMNH); Carroll Co., Glen (9.6 mi. n. on Ellis River) [May] (2; PMCh), Mount Chocorua [June] (2; MCZ); Cheshire Co., Cold River (Connecticut River) [Aug.] (2; PMCh), West Swazey [June] (1; MCZ); Coos Co., Crawford House [July] (1; CAS), Errol (Atkinson and Gilmanton Academy Grant at Dead Diamond River) [June-July] (5; PMCh), Fabyaus (Ammonoosuc River) [July] (4; MCZ, UMMZ), Jefferson Notch Road ([910m]) [July] (1; MCZ), Mount Madison (1; CUIIC), Mount Washington ([460m-760m] and Base Station, Mount Pleasant House, Pinkham Notch) [June-Sept.] (53; ALar, CAS, CNC, HGou, MCZ, UASM), Peabody River [July] (3; AMNH, USNM), Randolph ([400m]) (2; CUIIC), Shelburne [July]

(2; MCZ); Grafton Co., Monroe [Apr., June, Aug.-Sept.] (17; PMCh, RTBe), Rumney [June-July, Sept.] (12; MCZ, USNM); Hillsboro Co., Hollis [June-July] (2; PMCh), Merrimack (Souhegan River) [Sept.] (1; PSMi); Merrimack Co., Warner (Warner River) [July] (4; PMCh, PSMi); Rockingham Co., Exeter [June] (1; MCZ); Strafford Co., Dover (Mast Road Gravel Pit) [May] (12; PMCh), Durham [June] (5; DENH), Lee (Lamprey River) [Sept.] (10; PMCh); Sullivan Co., Claremont (Connecticut River) [June-July] (10; PMCh), Cornish Mills (Connecticut River) [Aug.] (3; PMCh). NEW JERSEY: (4; AMNH, USNM); Bergen Co., Hillsdale [Sept.] (4; USNM), Montvale [July] (2; MCZ), Riverdale [May] (1; MCZ); Essex Co., Montclair [Oct.] (1; AMNH), Upper Montclair [June] (2; MCZ); Hunterdon Co., Croton (branch of Wickecheoke Creek) [July] (2; OSUO), Hamden [May] (2; AMNH), Lambertville [May] (5; DRWh); Middlesex Co., Avenel [June] (2; UMRM); Morris Co., Budd Lake [Aug.] (6; AMNH), Morris Plains [May] (9; DRWh); Somerset Co., North Branch [May] (5; DRWh); Union Co., Rahway (South Branch Rahway River) [June] (1; CUIC); Warren Co., Hackettstown [May] (3; AMNH), Phillipsburg [July] (1; UASM); County unknown, Hemlock Falls [May] (1; AMNH). NEW YORK: (17; AMNH, ANSP, CAS, UMRM, USNM); Allegany Co., Rushford Lake [July] (1; UASM); Bronx Co., New York City (Bronx Park) [Aug.] (3; USNM); Broome Co., Chenango State Park [Aug.] (6; GRNo), New Windsor (4; USNM); Cattaraugus Co., Allegany State Park [July-Aug.] (7; CUIC, UASM, USNM); Dutchess Co., Pawling [Aug.] (1; DHKa), Poughkeepsie [June, Aug.] (15; RDav), Red Oak Mills [Aug.] (19; PMCh, RDav); Erie Co., Colden [July] (1; UCB); Essex Co., Chapel Pond [June] (2; CUIC), Opalescent River ([840m]) [Aug.] (1; RTBe), Pitchoff Mountain [May] (1; RTBe), Wallface Mountain [July] (5; AMNH, CAS, MCZ, USNM); Franklin Co., Lake Chateaugay ([610m]) [Aug.-

Sept.] (2; AMNH, MCZ); Fulton Co., [June] (1; USNM); Greene Co., [July] (2; ICCM); Monroe Co., Rochester [Aug.] (2; LACM); Ontario Co., [July] (6; UASM); Orange Co., Harriman State Park [Aug.] (3; HGou), Poplopen Pond [Aug.] (3; CAS), West Point [Aug.-Sept.] (2; USNM); Putnam Co., Brewster (2 mi. nw.) [Aug.] (9; PURC); Richmond Co., Staten Island (and Great Kills) [May-June, Oct.] (9; CAS, FMNH); St. Lawrence Co., Canton [Sept.] (3; LACM, NMDo, OSUO), Childwold [July] (1; CUIC); Suffolk Co., Long Island (Orient) [July-Aug.] (3; CUIC); Sullivan Co., Beaverkill (1; AMNH), Mountain Dale [July] (1; FMNH), Roscoe (Willowemoc Creek [430m]) [June] (2; DHKa); Tompkins Co., Dryden (5.5 mi. wsw. at Fall Creek [270m]) [May] (7; DHKa), Groton [Aug.] (2; JSch), Ithaca (and Cascadilla Creek, Coy Glen, 5 mi. sw. at Inlet Creek [150m]) [May-Aug., Oct.] (51; CAS, CUIC, DHKa, INHS, UASM, UCB, USNM); Ulster Co., (5; ICCM); Warren Co., Lake George [Aug.] (1; USNM), Ticonderoga (10 mi. s.) [June] (2; DJLa, USNM); Washington Co., West Hebron [June] (6; AMNH, CAS); Wayne Co., [June, Sept.] (3; UASM), Butler [Sept.] (1; FMNH); Westchester Co., Croton Reservoir [Sept.] (1; DHKa), Mosholu (3; CAS); Wyoming Co., Pike (2; CSU); County unknown, Catskill Mountains (7; MCZ), East Varick [Aug.] (1; PSUC), Hemlock Mountain [June] (4; AMNH). NORTH CAROLINA: (4; MCZ, USNM); Avery Co. [Aug.] (1; MCZ), Cranberry [July] (1; HoKn), Linville [Sept.] (13; MCZ); Boncombe Co., Black Mountain (North Fork Swannanoa River) [May-July] (6; AMNH, EDNC, MCZ), Swannanoa [May-June] (1; EDNC); Cherokee Co., Andrews [May] (3; EDNC); Great Smoky Mountains National Park, Indian Gap ([1520m]) (1; USNM), Oconaluftee River (11 mi. se. of Newfound Gap [550m], 2.3 mi. nw. of Smokemont [610m]) [May] (16; DHKa, USNM), Smokemont Loop Trail ([760m]) [July] (4; UAFA); Haywood Co., Retreat

[May-June] (3; USNM); Henderson Co., Bearwallow Creek [June] (1; USNM); Jackson Co., Balsam Gap ([1010m]) [Aug.] (2; MCZ), Dillsboro [Aug.] (1; AMNH), Round Knob [June] (1; USNM); Macon Co., Aquone [May] (2; EDNC), Highlands ([910m-1220m]) [June] (7; MCZ, RCGr), Scaly ([1020m]) [June] (1; RCGr); McDowell Co., Linville Falls ([910m]) [June] (2; EDNC, USNM), Old Fort [Oct.] (1; EDNC); Mitchell Co., Little Switzerland ([1040m]) [Sept.] (1; MCZ); Swain Co., Bryson City ([610m]) [Aug.] (1; MCZ), Nantahala Gorge ([610m]) [Aug.] (1; MCZ); Transylvania Co., Brevard (3 mi. e., 7 mi. ne., and 11 mi. n. on Highway 276) [Aug.-Sept.] (3; HoKn, UASM); Yancey Co., Celo ([840m]) [Aug.] (1; USNM), Crabtree Falls (10 mi. e. of Mount Mitchell) [June] (1; RTBe); County unknown, Black Mountains [May-July] (28; AMNH, CAS), Owens Gap (Tennessee Ridge [1220m]) [Aug.] (1; MCZ). OHIO: [July] (3; JSch, UMMZ); Adams Co., [Sept.] (1; UMMZ); Ashtabula Co., [Sept.] (1; PURC), Jefferson [Aug.] (1; OSUC); Athens Co., Athens [June] (4; LACM, UIMI, UWL), Canaan Township [May-June] (4; LACM, OSUO), Waterloo Township [May] (1; UWL); Cuyahoga Co., Cleveland [June] (1; MCZ); Hamilton Co., Cincinnati [May-June, Aug.-Sept.] (10; IUIC, MCZ, UMMZ); Hocking Co., [June, Aug.] (27; OSEC, OSUC, PURC), Old Man's Cave State Park [Aug., Oct.] (3; PURC); Holmes Co., Lakeville [July] (1; MCZ); Medina Co., [May] (2; RTBe); Meigs Co., Tappers Plains [Sept.] (1; LACM); Preble Co., [Aug.] (1; PURC), Houston Woods State Park [June] (10; RCGr), West Alexandria [Sept.] (3; RTBe); Ross Co., Bainbridge [June] (1; MSU); Summit Co., Virginia Kendall State Park [July] (2; RTBe); Vinton Co., Zaleski State Forest [June] (2; LACM, UWL). PENNSYLVANIA: (16; AMNH, ANSP, CAS, CSU, KSUC, MCZ, PSUC, UMMZ, USNM); Allegheny Co., [Apr.-May] (8; ICCM), Pittsburgh [May-July] (22; CAS, ICCM, OSUO, UASM), Upper

St. Clair Township [June] (1; UCR); Beaver Co., Raccoon Creek State Park [Aug.] (2; ICCM); Berks Co., French Creek State Park [May] (1; RTBe); Blair Co., Hollidaysburg (6 mi. e. on Highway 22) [June] (3; DJLa); Bucks Co., [Aug., Oct.] (2; ICCM), Delaware River (near Uhlerstown) [Oct.] (7; USNM), Forest Park [June] (1; AMNH); Center Co., Philipsburg [May] (4; CAS), State College (1; PSUC); Chester Co., West Chester [July] (1; UWEM); Cumberland Co., Camphill [Sept.] (1; PADA), Carlisle [Sept.] (1; WSU), New Cumberland [May, July] (3; PADA, VMKi); Dauphin Co., Beaver Creek [Oct.] (2; PADA), Harrisburg [May, Aug., Oct.] (11; PADA, VMKi), Rockville [Oct.] (6; PADA, VMKi); Delaware Co., Darby [May] (5; CAS), Glenolden [May] (2; FMNH), Swarthmore [Mar.] (3; USNM); Fayette Co., Ohiopyle [July] (9; PSUC), Uniontown [Oct.] (3; UMMZ); Forest Co., Cook Forest State Park [July] (1; PSUC); Lancaster Co., Lancaster [Aug.] (8; CNC, KSUC, USNM); Lebanon Co., Lebanon (2 mi. n.) [Sept.] (5; UMMZ); Luzerne Co., Conyngham [Sept.] (1; CAS), Wyoming [Sept.] (4; USNM); Monroe Co., [Aug.] (5; MCZ), Delaware Water Gap (1; AMNH); Montgomery Co., Glenside [June] (1; USNM), Merion [Sept.] (7; USNM); Northampton Co., Bethlehem [May] (9; FMNH, MCZ, PSUC), Easton [June, Aug.] (9; CAS, FMNH, UASM, UBC), Lehigh Gap [July] (5; USNM); Northumberland Co., Sunbury [July] (1; MCZ); Perry Co., Blain [Aug.] (2; USNM), New Bloomfield [July] (2; PADA); Philadelphia Co., Chestnut Hill [June-Sept.] (7; ANSP, MCZ), Frankford [Sept.] (1; USNM), Germantown [June, Oct.-Nov.] (10; ANSP, MCZ, USNM), Philadelphia [May] (6; ANSP, LACM, MCZ, USNM), West Park [May] (1; USNM), Wissahickon [Sept.] (2; MCZ); Pike Co., [Aug.] (10; ANSP, MCZ), Greentown [July] (2; USNM); Susquehanna Co., Montrose [Aug.] (4; CAS, UCD); Tioga Co., Holiday (1; UMRM); Warren Co.,

Allegheny State Park [Aug.] (1; PURC), Warren (1; CAS); Washington Co., McConnells Mill [July] (3; ICCM); Westmoreland Co., Jeannette [May-June] (20; ICCM); York Co., Davidsburg (5 mi. w.) [June] (4; GRNo); County unknown, "Gertie's Notch" [Oct.] (1; PADA), "Squaw Run Fox Chapel" [May] (2; INHS). RHODE ISLAND: Providence Co., North Scituate [May] (1; PMNH). SOUTH CAROLINA: Oconee Co., Salem (and at Little River) [Apr.] (4; USNM). TENNESSEE: Anderson Co., Norris [June] (2; FMNH); Great Smoky Mountains National Park, Little River (at Elkmont Campground) [June] (1; RCGr), West Prong Little Pigeon River (3 mi. s. of Gatlinburg [520m]) [May] (6; DHKa); Sevier Co., Gatlinburg ([760m]) [May-June, Sept.] (5; CNC, DHKa, SJSC, USNM). VERMONT: Addison Co., [July] (6; CUIC), South Starksboro [Aug.] (3; RDav), West Lincoln (2 mi. s.) [Sept.] (1; RTBe); Bennington Co., Bennington (South Stream) [July] (9; RTBe), Pownal (Hoosick River) [July] (2; RTBe), Heartwellville [Aug.] (1; AMNH), West Arlington (Battenkill River) [June] (8; RTBe); Caledonia Co., Croton (Wells River) [June] (2; PSMi), Lower Waterford (3 mi. w.) [June] (2; RTBe), St. Johnsbury (2 mi. e. at Moose River [170m]) [June] (4; DHKa), West Barnet (Harvey Lake) [July-Aug.] (13; PMCh); Chittenden Co., Bolton (Joiner Brook) [July] (15; DHKa), Burlington (and East Woods) [Sept.-Oct.] (10; RTBe), Hinesburg [Oct.] (1; RTBe), Jerico (Browns River) [Oct.] (1; RTBe), Jonesville (and 0.5 mi. e. and 2 mi. e. on Winooski River) [June, Sept.] (10; RTBe), Gillette Pond [June-July, Sept.] (15; RDav, RTBe), Milton (Lamoille River) [June] (1; RTBe), Richmond (2 mi. w.) [Sept.] (2; RTBe), Shelburne [Aug.] (1; CAS), South Burlington (Potash Brook) [Sept.-Oct.] (2; RTBe), Underhill [Sept.] (2; RTBe), Winooski [Sept.] (1; RTBe), Winooski River (1 mi. e. of River Road [90m]) [June] (2; DHKa);

Essex Co., Beecher Falls (Connecticut River [340m]) [July] (18; RTBe), Brighton (Lewis Road) [July] (5; RTBe), Ferdinand (Nulhagen River, Paul Stream) [July] (5; PSMi, RTBe), Granby (Moose River [350m]) [July] (9; RTBe), Lemington (Connecticut River [300m]) [July] (16; RTBe), Maidstone (Connecticut River) [July] (1; RTBe), Victory (Moose River [340m]) [July] (5; RTBe); Franklin Co., East Georgia (Lamoille River) [June, Sept.] (31; RTBe), Fairfax [June] (15; RDav); Lamoille Co., Bingham Falls ([370m-400m]) [May, Oct.] (5; RTBe), Elmore (Bedell Brook, Elmore State Park) [June-Aug.] (19; RTBe), Jeffersonville (Brewster River) [Aug.] (4; RTBe), Johnson (and Cranberry Bog, Ithiel Falls) [June-Oct.] (15; RTBe), Long Pond [Aug.] (3; RTBe), Mount Mansfield (Pringle's Ravine) [July] (1; RTBe), Moscow (Mansfield Trout Club) [July] (8; RTBe), South Cambridge (Brewster River) [May] (1; RTBe), Spruce Peak (Sterling Brook) [July] (4; RTBe), Stowe (and Little River, Luce Hill) [July-Sept.] (12; PMCh, RTBe), Waterville (and 2 mi. se., North Branch Lamoille River) [June, Sept.-Oct.] (9; DHKa, RTBe), West Elmore (Bedell Brook) [June-Aug.] (56; RTBe); Orange Co., Williamstown [Aug.] (5; CUIC); Orleans Co., East Charleston [July] (11; RTBe), Greensboro (Lake Caspian) [July-Aug.] (4; RTBe), Holland Pond ([400m]) [July] (5; RTBe), Lake Salem (3 mi. s. of Derby) [Sept.] (1; RTBe), Lake Willoughby (1.5 mi. s.) [Aug.] (1; RDav), Morgan (Underpass Pond Road) [July] (3; RTBe), North Troy (and 2 mi. s. at Jay Branch) [Aug.-Sept.] (9; RDav, RTBe), Orleans (Willoughby River [210m]) [July] (2; RTBe), Pherrins River (e. of Morgan) [July] (2; RTBe), Troy (Big Falls) [Aug.] (1; RTBe), Westmore (and Bald Mountain Trail) [July] (4; RTBe); Rutland Co., Danby (Flower Brook) [July] (3; RTBe), Ira (Ira Brook) [Aug.] (6; RTBe), Mount Tabor (Big Branch Creek) [June] (5; RTBe); Washington Co.,

Duxbury [July] (1; RTBe), Irasville (1 mi. w. at Mill Brook) [Sept.] (1; RTBe), Molly Falls Pond (2.5 mi. e. of Marshfield [120m]) [June] (1; DHKa), North Duxbury (0.75 mi. to 2.25 mi. s. on Ridley Brook [150m-240m]) [June, Sept.] (15; DHKa, RTBe); Windham Co., Bellows Falls [Aug.] (1; RTBe), Brookline (Grassy Brook, Putney Mountain) [June-July] (25; RTBe), Dover (Blue Brook) [Aug.] (3; RTBe), Grafton (Saxtons River) (5; RTBe), Guilford (Broad Brook) [Aug.] (9; RTBe), Newfane (Rock River, West River) [June] (3; RTBe), Putney (and Hemlock Ravine, Sacketts Brook) [June, Aug.] (19; CAS, RTBe); Windsor Co., Quechee Gorge (1 mi. s. of Quechee) [Aug.] (1; USNM), Woodstock [Aug.] (5; MCZ, RTBe).

VIRGINIA: (2; MCZ, RTBe); Arlington Co., [June] (2; USNM), Barcroft [Sept.] (2; USNM), Rosslyn [Sept.] (4; USNM, UWBM); Alleghany Co., Cliffdale (Roaring Run) [Sept.] (2; HoKn); Amherst Co., Otter Creek area (Blue Ridge Parkway mi. 56 [320m]) [May] (8; USNM); Bath Co., Williamsville [Sept.] (7; USNM); Clarke Co., Shenandoah River (4.1 mi. w. of Paris) [June] (11; GRNo); Dickenson Co., Breaks Interstate Park (8 mi. n. of Haysi) [June] (2; HoKn); Fairfax Co., [Sept.] (1; USNM), Black Pond [May] (1; MCZ), Turkey Run (2 mi. e. of McLean) [Sept.] (1; HoKn); Floyd Co., Copper Valley (2 mi. sw.) [Aug.] (3; HoKn, LRus); Franklin Co., Endicott (4 mi. sw.) [May] (1; RTBe); Grayson Co., Troutdale (4.5 mi. w. at Lewis Fork [1100m]) [June] (5; HoKn); Highland Co., Hightown (8 mi. nw. of Locust Springs [1160m]) [June] (3; HoKn); Montgomery Co., Radford (2 mi. e., Wildwood Park) [Oct.] (9; HoKn, LRus); Nelson Co. [July] (1; USNM); Patrick Co., Pinnacles of Dan (4 mi. sw. of Vesta [370m]) [July] (2; HoKn); Pulaski Co., Snowville (2 mi. s. at Laurel Creek) [Sept.] (5; DHKa); Rockbridge Co., Cave Mountain (8 mi. se. of Natural Bridge) [June] (1; RTBe), Natural Bridge [Sept.]

(2; MCZ); Shenandoah Co., Strasburg (6 mi. se. at Passage Creek) [Oct.] (4; HoKn, LRus), Waterlick (4.5 mi. s. at Elizabeth Furnace Campground) [July] (1; USNM); Smyth Co., Sugar Grove (3.5 mi. sw. at Dickey Creek [910m]) [Sept.] (3; HoKn), Little Laurel Creek (at Highway 600 [980m]), 2.0 mi. nw. of Konnarock [180m]) [May, Sept.] (20; DHKa, HoKn); Washington Co., Bristol (6 mi. nw. at Abrams Falls) [Sept.] (6; HoKn, LRus); County unknown, Ash Grove (2; CUIC), Big Meadows ([1070m]) [Sept.] (1; USNM). WEST VIRGINIA: Hardy Co., Wardensville (6 mi. s. [370m]) [Oct.] (15; USNM); Jefferson Co., Harpers Ferry [Sept.] (4; USNM); Pocahontas Co., Cranberry Glades (10 mi. n. of Visitor Center on Highway 150 [1400m]) [June] (8; HoKn); Randolph Co., Cheat Bridge [Sept.] (1; UASM), Mingo ([760m]) [July] (12; DHKa, ROM); Taylor Co., Grafton (3; USNM).

Doubtful Records. CANADA, BRITISH COLUMBIA: Vernon (1; CAS). UNITED STATES OF AMERICA, COLORADO: (1; MCZ).

No Data. (7; AMNH, INHS, ROM, RTBe, USNM).

Nebria paradisi Darlington

Map: Figure 382

Specimens examined: 1572 (751♂, 821♀)

UNITED STATES OF AMERICA

OREGON: Hood River Co., Mt. Hood ([1740m] and Hood River Meadows Ski Area [1920m-1950m], Sand Creek, Tillie Jane Creek [1830m]) [June-Aug.] (73; CAS, DHKa, UWEM). WASHINGTON: Lewis Co., Elk Pass (Goat Rocks Wilderness [1680m]) [Sept.] (1; PUCA); Mount Rainier National Park

([1830m-2130m]) [July-Aug.] (54; CAS, CUIC, DHKa, KUSM, MCZ, OSUO, USNM, UWBM, WSU), Burroughs Mountain (east slope [1890m-2130m]) [Aug.] (273; DHKa), Fryingpan Creek ([1160m]) [Aug.] (1; CNC), Mazama Ridge [July] (1; CAS), Nisqually Glacier (1; MCZ), Paradise area (Edith Creek Basin [1710m-1920m], Golden Gate [1920m-2010m], Paradise Park [1830m], Paradise Valley [1520m-1830m]) [July-Aug.] (970; ANSP, CAS, CNC, CUIC, DHKa, ICCM, KSUC, KUSM, MCZ, NMDo, OSUC, OSUO, UASM, UCB, UCD, UMRM, USNM, UWBM, WSU), Sluskin Falls [July] (1; UWBM), Snow Lake ([1520m]) [Aug.] (13; CNC), Van Trump Park ([1830m]) [Aug.] (4; CNC), Yakima Park ([2290m]) [Aug.] (4; RTBe); Skamania Co., Mount St. Helens (Forsyth Glacier at toe [1620m-1650m], below Leschi Glacier [1580m-1680m], northeast open slope [1340m-1620m], Windy Pass [1540m]) [July-Aug.] (138; CAS, DHKa, LRus); Snohomish Co., Glacier Peak [July] (2; CAS, UWBM); Yakima Co., Mount Adams (Bird Creek [1830m-2440m]) [July] (10; CAS, NMDo, UIMI, UWBM, WSU).

Doubtful Records. CANADA, ALBERTA: Lake Louise [Aug.] (6; GRNo, KUSM).

Nebria piperi Van Dyke

Map: Figure 409

Specimens examined: 1156 (587♂, 569♀)

CANADA

BRITISH COLUMBIA: (2; CAS, USNM); Copper Mountain [July] (18; CNC, MCZ, UASM, UBC, USNM, UWBM), Engineer [June] (1; CNC), Glenora (3; ANSP, MCZ, USNM), Kleanza Creek (near Terrace) [July] (3; CNC), Klehini River (Haines Highway mi. 50) [June] (2; CNC, UASM), Lake Alice Provincial

Park (0.2 mi. n. of Stump Lake at CheeKye River [100m]) [Aug.] (62; CAS, DHKa), Lillooet [June] (7; CNC, UASM), Merritt (Midday Valley) [July] (1; INHS), Muncho Lake Provincial Park (Alaska Highway mi. 445 at Peterson Creek, Alaska Highway mi. 459) [July] (3; BFCa, CNC), Seltat Creek (Haines Highway mi. 48.8) [June] (1; UASM), Spious Creek (near Merritt) [May, July] (15; CAS, CNC, DBUM, MCZ, UBC, UMMZ), Terrace (7 mi. e.) [June] (2; CNC), Whipsaw Creek (near Princeton) [May] (1; CNC), Zymoetz River (ne. of Terrace) [June] (3; CNC, UASM).

UNITED STATES OF AMERICA

ALASKA: Big Boulder Creek (Haines Highway mi. 34) [June] (16; CNC, UASM), Little Boulder Creek (Haines Highway mi. 31.5) [June] (14; MCZ, UASM), Skagway [July] (3; CAS). OREGON: Lane Co., Nimrod (0.9 mi. w. at McKenzie River [270m]) [July] (2; DHKa). WASHINGTON: (2; NMDo); King Co., Greenwater (5 mi. w. at White River [490m]) [Aug.] (17; DHKa), North Bend (Snoqualmie River) [Aug.] (2; UWBM); Mason Co., Lake Cushman [June] (3; UMMZ); Mount Rainier National Park [June-July, Sept.] (62; AMNH, CARM, CAS, CNC, DHKa, DJLa, ICCM, MCZ, SJSC, UASM, UBC, USNM, UWBM, WSU), Carbon River [June-July] (16; FMNH, UWBM), Fryingpan Creek [1160m-1190m] [July-Aug.] (40; CNC, DHKa, SJSC), Ipsut Creek [Aug.] (1; CAS), Kautz Creek [July] (2; UWBM), Longmire [June, Sept.] (4; DHKa, SJSC, UWBM), Narada Falls (Paradise River) [July] (1; UWBM), Nisqually River ([1160m-1420m] and Cougar Rock Campground [960m], Longmire area, below Nisqually Glacier [1220m-1520m], 0.1 mi. above Paradise River [980m], Sunshine Point Campground [610m]) [July-Sept.] (360; CAS, CUIC, DHKa, MCZ, OSUO, UASM, USNM, UWBM), North Fork Puyallup River (below toe of Puyallup Glacier [1100m-1650m]) [Aug.]

(18; CNC, DHKa), Paradise River ([1220m]) [July] (1; UWEM), South Fork Puyallup River [July] (1; UWEM), Stevens Creek ([1190m]) [July] (2; DHKa), Sunrise area (White River [1220m]) [July] (78; CAS, LRus, USNM, UWEM), White River (Silver Springs Campground [790m], White River Campground [1190m-1520m]) [June-Sept.] (96; AMNH, CAS, DHKa, FMNH, SJSC, UWEM), Yakima Park [Aug.] (3; MCZ); Olympic National Park [July-Aug.] (23; CAS, CUIC, KUSM, LACM, MCZ, UASM, USNM, UWEM), Elwha Campground [Aug.] (2; CUIC), Elwha River [July] (4; UWEM), Olympic Hot Springs [May-July] (5; CAS, UWEM); Pierce Co., Ashford (4 mi. e. on Nisqually River at Goat Creek [590m]) [July] (2; DHKa), Carbonado (Carbon River) [May] (9; DHKa, JSch), Elbe (Nisqually River [400m]) [July] (13; DHKa), Puyallup (1; WSU), White River (Silver Springs Recreation Area [760m]) [June] (6; USNM); Snohomish Co., Glacier Peak [July] (3; CAS, UWEM); Whatcom Co., Glacier (and 3 mi. e., 4 mi. e. at North Fork Nooksack River [380m]) [July-Aug.] (39; CAS, DHKa, LRus), Mount Baker [Sept.] (15; CAS, UWEM), Shuksan ([760m]) [Aug.-Sept.] (4; LRus), Shuksan Creek [Aug.] (1; UWEM), Skagit River (at Newhalem Campground) [July] (1; UWEM); Yakima Co., American River [July] (2; UWEM), Bumping Lake [June, Aug.] (9; UASM, UIMI, UMMZ, WSU), Bumping River [June, Sept.] (4; ANSP, CAS, UASM), Cliffdell (4.3 mi. se. at Naches River [730m]) [July] (125; DHKa), Naches (15.1 mi. nw. at Tieton River [720m]) [July] (8; DHKa), Naches River [July] (1; USNM), Rimrock [July] (1; USNM), Tieton River (at Naches River [560m]) [July] (1; DHKa), Wildcat Creek (at Tieton River [880m]) [July] (9; DHKa); County unknown, Mount Baker National Forest [Sept.] (1; SJSC).

Nebria piute Erwin and Ball, NEW STATUS

Map: Figure 410

Specimens examined: 158 (94♂, 64♀)

UNITED STATES OF AMERICA

UTAH: Beaver Co., Circleville Mountain (15.0 mi. w. of Junction [3140m], LaBaron Lake [2960m]) [June, Sept.] (153; CAS, DHKa, MCZ, UASM, USNM), Puffer Lake ([2510m-2560m]) [Aug.] (2; ANSP); Piute Co., Mount Belknap (14.1 mi. w. of Marysvale at Beaver Creek [2930m]) [July] (3; DHKa).

Nebria purpurata LeConte

Map: Figure 409

Specimens examined: 484 (250♂, 234♀)

UNITED STATES OF AMERICA

COLORADO: (4; ANSP, LACM, USNM); Archuleta Co., Upper San Juan River ([2130m-3200m]) [Aug.] (1; USNM); Boulder Co., Arapahoe Pass ([2740m-3350m]) [Aug.] (4; RTBe), Lake Isabelle ([3310m]) [July-Aug.] (3; CUB), Rainbow Lakes ([3350m]) [Aug.] (1; CNC), South St. Vrain Creek ([3200m]) [July] (5; CArm, CUB); Clear Creek Co., Berthoud Pass [Aug.] (5; USNM), Georgetown ([2530m-2620m]) [June] (2; CAS, MCZ), Leavenworth Valley (Argentine Road [2740m-3350m]) [June-July] (42; ANSP, CAS, DHKa, FMNH, KSUC, MCZ, ROM, UMMZ, USNM), Silver Plume ([2740m-3050m]) [June] (3; MCZ, USNM); Conejos Co., Monkhaven [June] (7; CAS); Custer Co., St. Charles River (1.9 mi. sw. of San Isabel [2710m-2830m]) [June] (9;

DHKa); Gunnison Co., Canyon of Big Blue ([2590m]) [June] (28; AMNH, ANSP, CAS, ICCM, KUSM, MCZ, UASM, UMRM, USNM); Hinsdale Co., San Juan Mountains ([3660m]) [Aug.] (4; CAS, MCZ, OSUO); Huerfano Co., near Sierra Blanca [July] (3; OSUO); Jackson Co., Agnes Lake [Aug.] (7; MSU); Lake Co., Lake Creek (7 mi. w. and 12 mi. w. of Twin Lakes) [Aug.] (14; DHKa, EAMa), North Fork Lake Creek ([3410m]) [Aug.] (6; DHKa); La Plata Co., Gold King Mill (Tirbircio Creek [2830m]) [Aug.] (4; UASM); Mineral Co., Creede ([2900m]) [July] (15; MCZ), Rio Grande River (4 mi. w. of South Fork) [Aug.] (3; DHKa), Wolf Creek Pass ([3050m-3290m] and 2 mi. w.) [July-Sept.] (17; CAS, DHKa, EAMa); Ouray Co., Ouray [June] (22; CAS, USNM); Park Co., Halfway (1; PADA), Middle Fork South Platte River (near Hoosier Pass [3510m]) [July] (9; DHKa); Rocky Mountain National Park ([3140m-3840m]) [July] (1; AMNH), Chasm Lake (on stream below [3810m]) [Aug.] (3; CARM), Fall River ([2620m]) [Aug.] (15; UASM, USNM), Fall River Road (1.7 mi. w. of Chasm Fall Trail) [Aug.] (1; UAFA), Lake Hiayaha [Aug.] (2; UAFA), Ouzel Falls ([2740m-3050m]) [July-Aug.] (12; CARM, DHKa); San Juan Co., Red Mountain Pass (and 1 mi. s. to 2 mi. s.) [July, Sept.] (3; CAS, KUSM), Silverton ([2990m-3050m]) [June, Aug.] (6; CSU, MCZ, USNM); San Miguel Co., South Fork San Miguel River ([2590m]) [July] (1; MCZ); Summit Co., Blue Lakes ([3600m]) [July] (3; DHKa), Monte Cristo Creek ([3350m]) [July] (3; DHKa), Quandary Peak (east slope [3410m-3960m]) [July-Aug.] (112; DHKa, USNM); County unknown, "Laramie Co." (1; ICCM), Mount Boullion (1; ICCM). NEW MEXICO: Rio Arriba Co., Rio Puerco (at Rio Puerco Campground [2350m-2440m]) [June] (2; DHKa); Taos Co., Red River (2.2 mi. w. of Red River P. O. at June Bug Campground [2610m]), and

4.1 mi. w. of Red River P. O. [2580m]) [June] (95; DHKa).

Doubtful Records. UNITED STATES OF AMERICA, COLORADO: Denver Co., Denver (1; ICCM).

No Data. (1; LACM).

Nebria sahlbergii Fischer

Map: Figure 391

Nebria sahlbergii sahlbergii Fischer

Specimens examined: 4125 (2200♂, 1925♀)

CANADA

ALBERTA: Banff National Park, Banff [Sept.] (1; CNC), Bow Pass [Sept.] (1; RTBe), Lake Louise [Aug.] (1; AMNH), Popes Peak (east slope [2530m]) [Aug.] (1; SJSC); Jasper National Park, Jasper [Aug.] (8; CNC, MCZ), Medicine Lake [July] (46; CAS, CUIC), Miette Hot Springs (Sulphur Creek [1370m]) [July] (51; DHKa, MCZ), Miette River (at Meadow Creek [1100m]) [July] (2; DHKa), Mount Edith Cavell ([1680m]) [July-Aug.] (2; DHKa, ROM); Other localities, Assineau River (near Lesser Slave Lake) [July] (2; DHKa), Cardinal River [May] (7; DHKa), Wildhay River (20 mi. nnw. of Entrance on Grande Cache Road [1310m], 30 mi. wnw. [1220m] and 40 mi. nnw. [1430m] of Entrance) [June] (8; DHKa, UASM). BRITISH COLUMBIA: Glacier National Park, Glacier [July-Sept.] (16; BFCa, CAS, USNM), Illecillewaet Creek [July] (29; GRNo, USNM), Rogers Pass ([1370m]) [Aug.] (1; CUIC); Yoho National Park [July] (2; CAS), Cathedral Campground [Aug.] (1; RTBe), Field ([1460m] and 3 mi. e. on Kicking Horse River) [June-July] (17; CAS, CUIC, UBC, USNM), Kicking

Horse River (at Amiskwi River, at Kicking Horse Campground) [July-Aug.] (10; DHKa, UBC), Yoho River ([1520m], 4 to 12 mi. e. of Field, at Takakkaw Falls [1430m]) [Aug., Oct.] (20; DHKa, UASM); Other localities, Atlin ([670m]) [Aug.] (1; CNC), Barkerville (Cunningham Creek, Grouse Creek [1280m], Williams Creek [1280m]) [Aug.-Sept.] (35; CAS, UBC, UWB), Big Boulder Creek (e. of Pine Pass) [June] (11; CNC, UASM), CheeKye [Aug.] (1; UBC), Chetwyn (5 mi. w. at Bissett Creek) [Aug.] (1; MSU), Chilkat Pass ([1070m], at Kelsall Lake [1070m]) [July] (4; CNC, UASM), Clear Creek (Haines Highway mi. 61.3) [Aug.] (14; UASM), Contact Creek (Alaska Highway mi. 588.1) [Aug.] (4; DHKa), Cottonwood Creek [July] (1; CNC), Cultus Lake Provincial Park (Entrance Bay Campground) [June] (1; ROM), Downie Creek [Aug.] (1; CAS), Garibaldi Provincial Park (Black Tusk Meadow [1580m], Diamond Head Trail [1070m]) [July-Aug.] (20; CNC, UBC), Golden (1.9 mi. e. on Kicking Horse River [1160m]) [Aug.] (14; DHKa), Golden Ears Provincial Park (Alouette Lake) [July] (1; NMDo), Goodrich Creek (12 mi. w. of Little Prairie) [June] (1; UASM), Hope [July] (1; BFCa), Hope Mountains [Aug.] (1; INHS), Hunter Creek (at Restmore Lodge on Fraser River) [July] (4; CAS), Hyland River (Alaska Highway mi. 605) [Aug.] (1; DHKa), Indian River [Aug.] (1; CAS), Kalum Lake (n. of Terrace) [June] (3; CNC), Klehini River (Haines Highway mi. 50) [June] (20; CNC, UASM), Lake Alice Provincial Park (0.2 mi. n. of Stump Lake at CheeKye River [100m]) [Aug.] (53; CAS, DHKa), Liard River (at Trout River) [June] (1; CNC), Lillooet [June] (3; CNC), MacDonald River (Alaska Highway mi. 413 [1370m]) [July] (1; CNC), Manning Provincial Park (Coldsprings Campground, Skagit River) [July-Aug.] (13; BFCa, ROM, RTBe), Mara Lake [Aug.] (1; BFCa), Midday Valley (near Merritt) [July] (4; INHS, MCZ), Mission City [June]

(1; CNC), Mount Robson Provincial Park (at Mount Robson Campground [1830m]) [July] (20; ANSP, MCZ, UASM, UBC, USNM), Muncho Lake Provincial Park (Muncho Lake) [Aug.] (3; CNC, UASM), Nina Creek (24 mi. nw. of Manson Creek [1070m]) [Aug.] (16; RFre), Onehundredfifteen Creek (Alaska Highway mi. 403.4) [Aug.] (1; DHKa), Perow area (McEvoy Creek) [June] (1; UASM), Peterson Creek (Alaska Highway mi. 445) [June] (4; CNC), Pine Pass (Pine River) [Aug.] (1; MSU), Prince Rupert (and at Mount Hays [300m-610m]) [June-July] (4; CNC, CUIC), Quesnel Lake [Sept.] (3; CAS, KUSM), Revelstoke [Aug.] (3; BFCa), Seltat Creek (Haines Highway mi. 49) [June] (19; CNC, UASM), Seton Creek (near Lillooet) [June] (7; UASM), Skagit River (Hope Trail at Cañon Camp [760m]) [July] (6; MSU, UBC, USNM), Snass Creek ([760m]) [July] (2; MSU, UBC), Spious Creek [May, July] (9; CAS, CNC, MCZ), Stanley [June-Aug.] (44; CAS, CNC, KUSM, UBC), Summit Lake (Alaska Highway mi. 392 [1280m]) [July] (1; CNC), Terrace (7 mi. e.) [June] (1; CNC), Thornhill Mountain (near Terrace [1520m]) (1; MCZ), Tetsa River (Alaska Highway mi. 376 to 383) [June, Aug.] (6; DHKa, LRus, UASM), Thompson River (near Ashcroft) [June] (1; JVMa), Three Guardsmen Pass (Haines Highway mi. 56.7) [June] (2; CNC, UASM), Toad River (at Alaska Highway) (2; JVMa), Trout Creek (13 mi. n. of Smithers) [June] (5; CNC, UASM), Tyee (2.6 mi. w.) [June] (3; UASM), Vancouver [Mar., June, Aug.] (4; INHS, NMDo), Vernon [July-Aug.] (3; CAS, UASM), Whipsaw Creek (at Hope Trail [1220m]) [July] (3; MCZ, UBC), Wigwam Inn (Burrard Inlet) [June, Sept.] (7; CAS, CNC, UBC), Zymoetz River (ne. of Terrace) [June] (1; UASM); Vancouver Island [June] (3; JVMa), Abernathy Brook (e. of Youbou) [Aug.] (5; UASM), Alberni (9 mi. e. at West Cameron Creek, 30 mi. w.) [May, Aug.] (4; CNC, UASM), Cowichan Lake [June] (1; CNC), Duncan (Cowichan River) [Oct.] (2; UWEM),

Englishman River Falls State Park (3 mi. w. of Parksville) [Aug.] (2; UASM), Goldstream Provincial Park [May-June, Aug.] (46; DHKa, UWEM), Lockwood Creek (near Parksville) [May] (5; UASM), MacMillan Provincial Park (12 mi. e. of Alberni) [Aug.] (2; UASM), Mount Arrowsmith Trail ([300m-980m]) [Aug.] (2; UASM), Nanaimo (Chase River) [July-Sept.] (7; MCZ, USNM, UWEM), Parksville [Aug.] (1; UWEM), Port Hardy [June] (3; UWEM), Strathcona Provincial Park (8 mi. e.) [June] (1; ROM), Victoria [June-July] (32; UASM, USNM). YUKON TERRITORY: Logjam Creek (Alaska Highway mi. 751.1) [Aug.] (3; DHKa), Morley River (Alaska Highway mi. 777) [Aug.] (3; DHKa), Partridge Creek (Alaska Highway mi. 735.9) [Aug.] (3; DHKa), Quill Creek (Haines Highway mi. 150) [June] (1; UASM), Rancheria (Swift River) [Aug.] (16; CNC, UASM), Seagull Creek (Alaska Highway mi. 733) [Aug.] (5; DHKa), Swift River (Alaska Highway mi. 733 to 736.2) [June, Aug.] (38; CNC, DHKa, LRus, UASM), Upper Rancheria River (Alaska Highway mi. 721.6) [Aug.] (5; DHKa), Upper Liard River (Alaska Highway mi. 642.6) [June] (5; CNC, UASM), Whitehorse Pass [July] (2; CAS).

UNITED STATES OF AMERICA

ALASKA: Anchorage [June] (2; CNC), Big Boulder Creek (Haines Highway mi. 34) [June] (21; MCZ, UASM), Bird Creek (27 mi. se. of Anchorage [July] (17; MCZ, UASM), Cape Yakataga [June] (13; CAS), Cold Bay [July] (224; DHKa, MCZ, UASM), Chilkat River (13 to 14 mi. n. of Haines) [June] (2; MCZ, UASM), Hope [June-July] (9; CNC), Katmai [June-July] (12; CAS, DHKa, OSUC, USNM), Ketchikan [July] (4; DHKa, FMNH), Kodiak Island (Amara Lake area, Anton Larsen Bay, Bear Lake, Kalsin Bay, Kodiak and 10 mi. n. and 30 mi. s., Pasagshak Bay, Shasta Creek [240m]) [June-

Sept.] (48; CAS, MCZ, OSUC, UASM, USNM, UWEM), Glenn Highway (at Knik River) [Aug.] (2; UASM), Kuiu Island (Alvin Bay, Reid Bay) [Aug.] (13; DHKa, FMNH), Kupreanof Island (Totem Bay) [Aug.] (12; FMNH), Little Boulder Creek (Haines Highway mi. 31) [June] (11; MCZ, UASM), Muir Glacier (at toe) (9; MCZ, UWEM), Prince of Wales Island (Port Protection) [Aug.] (3; FMNH), Savonoski (Naknek Lake) [June-Aug.] (3; CAS, OSUC), Seward [July] (1; CUIC), Sitka [June] (1; USNM), Skagway [July] (5; CAS), White Pass [July] (2; LACM), Worthington Glacier (Richardson Highway mi. 28) [Aug.] (5; LRus, MCZ, UASM); Aleutian Islands, Akutan [Aug.] (3; CAS), Umnak Island (Crater Creek, Okmok Caldera, Tulik Volcano, Umnak and 2 mi. and 10 mi. n.) [July] (104; CNC, MCZ, UASM), Unalaska Island (Broad Bay at mouth of Makushin River, Driftwood Bay, Dutch Harbor, Glacier River, Makushin Bay at south end, Mount Makushin on north slope [400m-460m], Nateekin Bay at mouth of Shaisinkof River, Unalaska) [July-Sept.] (542; CAS, CUIC, DHKa, MCZ, UASM, USNM, UWEM), Unimak Island (False Pass) [July] (1; CUIC). OREGON: Clackamas Co., Brightwood (Salmon River [320m]) [May, July] (59; DHKa, MSU), Clackamas River (at Austin Hot Spring) [July] (1; OSUO), Colton [Apr.] (1; CAS), Rhododendron (and 1 mi. se. on Zig Zag River [490m-600m]) [July-Aug.] (18; CAS, DHKa), Zig Zag River [Sept.] (1; UWEM); Clatsop Co., Astoria [July] (2; MSU), Cannon Beach [June] (5; CAS); Columbia City [Sept.] (1; OSUO), Mist [July] (1; CAS); Crater Lake National Park [June, Sept.] (3; JSch); Deschutes Co., Sisters (Squaw Creek [980m]) [Aug.] (15; CAS, DHKa), Soap Creek ([1750m]) [Aug.] (20; CAS, DHKa); Douglas Co., North Umpqua River (at Toketee Lake [730m]) [July] (61; DHKa), Steamboat Creek (at Steamboat Falls [410m]) [July] (1; DHKa); Hood River Co., East Fork Hood River (4.2 mi. s. of Mount

Hood Post Office [730m]) [July] (3; DHKa), Hood River (and 0.2 mi. s. on Hood River [60m]) [May, July] (12; DHKa, UWEM), Mount Hood (east slope, south slope, Cloud Cap, Robin Hood Campground, Sand Creek) [July] (44; CAS, DHKa, MCZ, MSU, NMDo, UCR, UIMI, UWEM), Parkdale (Hood River Rapids) [July] (2; CAS), Perham Creek [June] (1; DHKa), Polallie Campground [May] (1; JSch); Jackson Co., Butte Falls (0.3 mi. e. on South Fork Big Butte Creek [730m]) [July] (7; DHKa), Castle Creek [July] (1; UIMI); Lane Co., Jordan Creek [May] (1; DHKa), McKenzie River [June] (5; UWEM), Nimrod (0.9 mi. w. on McKenzie River [270m]) [July] (14; DHKa), North Fork McKenzie River (at Boulder Creek [520m]) [July] (10; DHKa), Oakridge (4.6 mi. nw. at Willamette River) [June] (5; USNM), Salt Creek (17 mi. e. and 22.6 mi. se. of Oakridge) [July, Sept.] (6; DHKa, LRus); Linn Co., Lost Prairie (40 mi. e. of Sweet Home [910m]) [Sept.] (4; LRus), Marion Forks (3.2 mi. s. at Downing Creek [930m], 6 mi. s. at North Santiam River [910m]) [July-Aug.] (11; CAS, DHKa), North Fork McKenzie River (5.2 mi. s. of Highway 20 on Highway 126 [910m]) [July] (3; DHKa); Marion Co., Abiqua Creek (12.5 mi. sw. of Molalla [80m]) [July] (2; DHKa), Cheat Creek (at Whitewater Road [910m]) [July] (16; DHKa), Detroit ([460m], 2.5 mi. e. at North Santiam River [490m], 5 mi. n.) [June-Sept.] (21; CAS, DHKa, LRus, UWEM), Mount Jefferson (northwest slope at Russell Creek [1680m-1740m]) [Aug.] (1; DHKa), North Santiam River (and 13 mi. se. of Detroit) [July-Aug.] (3; FMNH, OSUO), Silver Falls State Park (North Falls) [June, Aug.] (24; LRus, RTBe, UWEM); Multnomah Co., Horsetail Falls State Park (Horsetail Falls [120m]) [May-July] (57; DHKa, JSch, ODA, OSUO, USNM), Oneonta Gorge (Columbia River) [June] (1; DHKa); Umatilla Co., south of Kooskooskie (Washington) [June] (2; UWEM). WASHINGTON: (11; AMNH, ANSP,

INHS, LACM, USNM); Chelan Co., Tumwater Canyon ([610m]) [May] (1; LRus); Clallam Co., [Sept.] (1; CAS), Elwha River [July] (11; UWEM), Forks [July] (5; CAS), Klahowya State Park (Soleduck River) [June] (3; CAS), La Push [May] (5; CNC), Port Angeles (and 4 mi. w.) [May-July] (8; CAS, CDA, DHKa, UASM), Soleduck River [Sept.] (1; SJSC), Ozette River [May] (1; UWEM); Clark Co., Battle Ground (1 mi. s. at East Fork Lewis River [80m]) [May] (20; DHKa), Lewisville Park [June] (1; MSU); Cowlitz Co., Cougar [Sept.] (1; OSUO), North Fork Toutle River (14 mi. e. of Toutle [300m]) [Aug.] (32; CAS, DHKa); Grays Harbor Co., Lake Quinault [May] (2; CAS), Satsop River [Sept.] (1; UWEM); Jefferson Co., Port Townsend [July] (2; MCZ); King Co., Carnation [May] (5; LRus, UWEM), Cedar Mountain [May] (3; UWEM), Cedar River [May] (1; UWEM), Enumclaw [July] (2; UWEM), Fall City [May] (2; LRus), Green River Gorge [May] (1; LRus), Greenwater (Greenwater Campground, 5 mi. w. on White River [490m]) [June, Aug.] (31; DHKa, UWEM), North Bend (and at Maloneys Grove) [May-Aug.] (18; CAS, FMNH, UIMI, UWEM), Renton (Cedar River) [May] (3; UWEM), Skykomish area [July] (2; UASM), Snoqualmie River (at Snoqualmie Falls) [July, Sept.] (3; UWEM), Snoqualmie Pass [July] (1; CAS), Stevens Pass area (White Rock Springs) [July] (2; CAS); Kittitas Co., Cle Elum [June-July] (6; UWEM), Easton (15; CAS, USNM), Ellensburg [May, Sept.] (48; DHKa, FMNH, UWEM), Teanaway Ridge ([910m]) [July] (4; LRus), Thorp [May] (4; LRus, UWEM); Klickitat Co., White Salmon [Sept.] (2; UWEM); Lewis Co., Carlson (8.4 mi. s. at East Fork Tilton River [350m]) [July] (7; DHKa), Cinebar [June] (1; CDA), Curtis (1 mi. n. at Chehalis River [140m]) [May] (2; DHKa), Packwood (3 mi. ne. at Lake Creek [370m]) [July] (4; DHKa), White Pass (1.5 mi. w. at Millridge

Creek [1280m]) [July] (1; DHKa); Mason Co., Shelton [Aug.] (2; UWEM), South Fork Skokomish River [July] (1; UWEM); Mount Rainier National Park [June-Sept.] (106; CAS, CUIC, DHKa, KUSM, LACM, MCZ, SJSC, UBC, USNM, UWEM), Carbon River [June-July] (7; FMNH, UWEM), Fryingpan Creek ([1160m]) [July-Aug.] (126; CNC, DHKa, SJSC), Kautz Creek [July, Sept.] (24; UWEM), Longmire ([910m] and at Nisqually River) [May, July-Sept.] (66; CAS, CNC, SDSU, UWEM), Nisqually River ([1170m-1420m], at Cougar Rock Campground [960m], near Longmire, at toe of Nisqually Glacier, 0.1 mi. above Paradise River [980m], at Sunshine Point Campground [610m]) [July-Aug.] (71; CAS, DHKa, UWEM), North Fork Puyallup River (at toe of Puyallup Glacier [1100m-1650m]) [Aug.] (2; CNC, DHKa), Ohanapecosh [June, Aug.] (4; SJSC, USNM), Paradise area (Paradise Park, Paradise Valley) [July-Aug.] (2; CAS, UWEM), Silver Creek [Aug.] (1; UWEM), Sunrise area [July] (31; CAS), West End Road [July] (1; CAS), White River (at White River Campground [1190m-1520m]) [June-Sept.] (112; CAS, CUB, DHKa, FMNH, SDSU, USNM, UWEM); Olympic National Park [Aug.] (15; CAS, CUIC, LACM, MCZ), Dosewallips River (at Mascot Campground) [July] (3; UWEM), Elwha River ([300m] and at Elwha Campground) [May, Aug.] (27; ALar, CUIC, LRus), Lake Crescent [June, Aug.-Sept.] (34; CAS, CUIC, LRus, UWEM), Olympic Hot Springs (Boulder Creek [610m-780m]) [May-Aug.] (64; CAS, CNC, DHKa, UIMI, UWEM), Sol Duc Hot Springs [June-July, Sept.] (8; CAS, UWEM); Pierce Co., Ashford (4 mi. e. on Nisqually River at Goat Creek [590m-610m]) [July] (62; DHKa), Elbe (Nisqually River [400m]) [July-Aug.] (96; DHKa), Fairfax [Oct.] (4; FMNH), Kapowsin [Oct.] (1; FMNH), South Prairie [Oct.] (1; FMNH), White River (at Silver Springs Campground [760m-790m]) [June, Aug.] (312; DHKa, UASM); Skagit Co., Van Horn [Apr.] (2; UWEM); Skamania Co., Carson (8 mi. n. at Wind River

[340m]) [May, July] (6; DHKa), Columbia River (15 mi. w. of Underwood) [May] (10; DHKa), Cook [Aug.] (1; UWBM), Mount St. Helens (north slope at Leschi Creek [980m]) [Aug.] (1; DHKa), North Bonneville (1 mi. w. at Hamilton Creek [50m]) [May] (5; DHKa), North Fork Toutle River (at Spirit Lake Lodge [940m]) [Aug.] (1; DHKa); Arlington (North Fork Stillaguamish River) [Aug.] (2; UWBM), Darrington [May] (1; UWBM), Glacier Peak [Aug.] (2; UWBM), North Fork Sauk River [June] (1; UWBM), Stillaguamish [Aug.] (2; UWBM), Sultan [May] (2; UWBM); Thurston Co., Deschutes River [May] (2; UWBM); Walla Walla Co., Kooskooskie [May, Aug.] (24; UWBM), Walla Walla (and at Mill Creek, 2 mi. s. at Walla Walla River [320m]) [May-Sept.] (60; CAS, DHKa, JSch, MCZ, OSUO, UIMI, UWBM, WSU); Whatcom Co., Glacier (and 3 and 4 mi. e. on North Fork Nooksack River [380m]) [July-Aug.] (29; CAS, DHKa, LRus), Mount Baker (1 mi. e. of Picture Lake at Razor Hone Creek [1040m]) [Aug.-Sept.] (7; DHKa, UWBM), North Fork Nooksack River (19 mi. w. of Glacier [270m], at Silver Fir Campground [610m]) [Aug.] (39; CAS, DHKa), Shuksan ([760m]) [Aug.-Sept.] (14; LRus), Shuksan Creek [Aug.] (30; UWBM); Whitman Co., Pullman [June] (1; ICCM); Yakima Co., American River (at Hell's Crossing Campground [1040m]) [July-Aug.] (27; DHKa, KUSM, UIMI, USNM, UWBM), Bumping River (8 mi. sw. of Highway 410 [1010m]) [July-Aug.] (7; DHKa, JSch, USNM), Cliffdell (4.3 mi. se. on Naches River [730m]) [July] (1; DHKa), Mount Adams (Chaparral Creek [880m]) [Sept.] (10; FMNH, UWBM), Naches River (at Tieton River [560m]) [July-Aug.] (3; DHKa, USNM), Tieton Dam [Aug.] (4; CAS, PURC, WSU), Tieton River (15.1 mi. nw. of Naches [720m]) [July] (1; DHKa); County unknown, Pack Forest [Aug.] (1; UWBM).

Doubtful Records. UNITED STATES OF AMERICA, CALIFORNIA: (2; ANSP).

No Data. (1; MCZ).

Nebria sahlbergii modoc Kavanaugh, NEW SUBSPECIES

Specimens examined: 13 (9♂, 4♀)

UNITED STATES OF AMERICA

CALIFORNIA: Modoc Co., Cedar Pass [June] (2; USNM), New Pine Creek (4 mi. e. at Pine Creek [1740m]) [May] (11; DHKa).

Nebria sahlbergii triad Kavanaugh, NEW SUBSPECIES

Specimens examined: 214 (99♂, 115♀)

UNITED STATES OF AMERICA

CALIFORNIA: Siskiyou Co., Gulick Creek (at road to Josephine Lake [1550m]) [Aug.] (1; CAS); Trinity Co., Boulder Creek (at Goldfield Campground [1070m]) [July] (56; CAS, DHKa), Coffee Creek (at Coffee Creek Ranch [1070m]) [July] (32; CAS, DHKa), Morris Meadows ([1340m]) [Aug.] (1; PUCA), South Fork Salmon River (at Big Flat Campground [1490m]) [June-Aug.] (124; CAS, DHKa, FMNH).

Nebria schwarzi Van Dyke

Map: Figure 409

Nebria schwarzi schwarzi Van Dyke

Specimens examined: 243 (147♂, 96♀)

CANADA

ALBERTA: [July-Aug.] (9; BFCa, DBUM); Banff National Park, Banff

[June-Sept.] (60; AMNH, CAS, DHKa, KSUC, KUSM, MCZ, UASM, UCD, USNM), Bow River (at Spray River) [June, Aug.] (28; CAS, UASM), Cascade River [Aug.] (19; AMNH, CAS, MCZ, UASM), Lake Louise [June-Sept.] (31; AMNH, FMNH), Lake Minnewanka [July] (1; BFCa), North Saskatchewan River (at Highway 93) [July] (3; DHKa), Spray River [Aug.] (2; CAS); Jasper National Park, Jasper [Aug.] (1; CNC), Miette River (at Meadow Creek) [July] (1; HGou); Other localities, Athabasca River (at Grande Cache Road [1100m]) [June] (1; DHKa), Cline River (at Highway 11) [Aug.] (9; DHKa), Ghost Dam [July] (11; BFCa), North Fork Wildhay River (40 mi. wnw. of Entrance [1430m]) [June] (2; DHKa). BRITISH COLUMBIA: Yoho National Park [June-July] (4; DHKa, UWEM), Field (and 3 mi. e. at Kicking Horse River) [June-Sept.] (37; CAS, CNC, DHKa, DJLa, MCZ, USNM), Yoho River (4 to 12 mi. ne. of Field, at Takakkaw Falls) [Aug.] (17; DHKa, JBel, UASM); Other localities, Golden (1.9 mi. e. at Kicking Horse River [1160m]) [Aug.] (8; DHKa).
No Data. (1; ROM).

Nebria schwarzi beverlianna Kavanaugh, NEW SUBSPECIES

Specimens examined: 255 (133♂, 122♀)

UNITED STATES OF AMERICA

WYOMING: Sublette Co., Bondurant (8 mi. nw. at Hoback River [2100m]) [July-Aug.] (255; DHKa).

Nebria spatulata Van Dyke

Map: Figure 403

Nebria spatulata spatulata Van Dyke

Specimens examined: 70 (27♂, 43♀)

UNITED STATES OF AMERICA

CALIFORNIA: Kings Canyon National Park, Brewer Lake [Sept.] (3; CAS, CNC); Sequoia National Park, Mount Sillman ([3050m]) [Aug.] (4; CAS, CNC), Rattlesnake Creek (1; CNC); Tulare Co., Franklin Lakes ([3050m-3140m]) [July-Sept.] (62; CAS, CNC, DHKa, KSUC, MCZ).

Nebria spatulata sierrae Kavanaugh, NEW SUBSPECIES

Specimens examined: 60 (29♂, 31♀)

UNITED STATES OF AMERICA

CALIFORNIA: Inyo Co., Big Pine Creek (at Finger Lake [3290m]) [Aug.] (4; CAS); Mono Co., H. M. Hall Natural Area ([3350m]) [July-Sept.] (9; RPPa), Saddlebag Lake [Sept.] (3; CAS), White Mountain (northeast slope in cirque above Big Horn Lake [3290m-3480m]) [July] (13; DHKa); Tuolumne Co., Sonora Pass ([2740m-3350m]) [July] (3; UCB, USNM); Yosemite National Park, Maclure Creek Basin ([3290m-3380m]) [Sept.] (1; DHKa), Mount Lyell ([3350m]) [July-Aug.] (23; CAS), Tioga Pass ([3050m]) [Aug.] (2; CAS).

Doubtful Records. UNITED STATES OF AMERICA, CALIFORNIA: San Bernardino Co., [July] (2; CAS).

Nebria suturalis LeConte

Map: Figure 398

Specimens examined: 304 (155♂, 149♀)

CANADA

ALBERTA: Jasper National Park, Athabasca Glacier (at toe [2040m]) [July] (10; DHKa). NEWFOUNDLAND: Labrador, Emily Harbour [July] (1; CUIC), Voisey Bay (1; CNC). ONTARIO: Thunder Bay District, Black Bay (on islands at bay mouth) (3; MCZ). QUÉBEC: Territoire du Nouveau-Québec, Inoucdjouac [July] (2; ALar), Rivière Koroc [July] (1; DBUM).

UNITED STATES OF AMERICA

COLORADO: (1; MCZ); Boulder Co., Ward (w. of [3810m]) [July] (2; CArm); Clear Creek Co., Loveland Pass ([3660m]) [July] (1; CAS), Mount Evans ([4270m] and Summit Lake [3900m]) [June-July] (2; CNC); Laramie Co., Fort Collins (w. of) (2; ICCM); Rocky Mountain National Park, Hagues Peak ([3960m]) [Aug.] (2; RTBe), Longs Peak [July] (2; CArm, CUB); Summit Co., Grays Peak ([4220m] and summit [4350m]) [July, Sept.] (2; DHKa), Quandary Peak (east slope [3570m-3960m]) [July-Aug.] (19; DHKa, USNM). NEW HAMPSHIRE: (28; AMNH, ANSP, CAS, DHKa, INHS, KUSM, MCZ, USNM); Coos Co., Mount Adams [July] (1; MCZ), Mount Jefferson (Monticello Lawn [1650m]) [July] (5; PMCh), Mount Madison (1; CUIC), Mount Monroe (and Red Lake [1520m]) [June-July] (4; CAS, MCZ), Mount Quincy Adams (Starr Lake) [June] (1; MCZ), Mount Washington ([1520m-2190m] and Lake of the Clouds [1520m], summit area [1890m], Tuckerman Ravine [1550m-1650m]) [May-Sept.] (160; ALar, AMNH, ANSP, CAS, CNC, DHKa, ICCM, KUSM, MCZ, PADA, PMCh, PMNH, RDav, UASM, USNM, UWEM); Grafton Co., Franconia area [July] (1; MCZ); County unknown, White Mountains ([above 460m]) [July-Aug.] (11; ICCM, MCZ, MSU, USNM). NEW YORK: (1; AMNH); Essex Co., Haystack Mountain [Aug.] (1; RTBe).

VERMONT: Chittenden Co., Mount Mansfield ([1250m], Chin, Nose, Subway [1190m-1220m], summit [1310m]) [June-Aug.] (36; CAS, DHKa, RTBe, UASM, USNM). WYOMING: Grand Teton National Park, North Fork Garnet Canyon (below headwall [3510m]) [Aug.] (1; SJSC).

Doubtful Records. CANADA, ONTARIO: Middlesex Co., London (1; CNC).

UNITED STATES OF AMERICA, MASSACHUSETTS: (1; MCZ).

No Data. (1; AMNH).

Nebria trifaria LeConte

Map: Figure 411

Nebria trifaria trifaria LeConte

Specimens examined: 1219 (617♂, 602♀)

UNITED STATES OF AMERICA

COLORADO: (2; ANSP, LACM); Boulder Co. [Aug.] (1; CUB), Arapahoe Pass ([2740m-3050m]) [Aug.] (5; RTBe), Jenney Lake ([3200m]) [July] (1; CArm), Lake Isabelle ([3170m]) [July] (7; CArm), Jasper Lake ([3260m]) [Aug.] (1; CArm), Lefthand Creek (5 mi. e. of Ward [2530m]) [July-Aug.] (80; CArm, DHKa), Little Royal Gorge [Aug.] (1; CUB), Long Lake ([3140m]) [July, Sept.] (6; CArm), Mitchell Lake ([3290m]) [July] (7; CArm, CUB), Rainbow Lakes (10 mi. sw. of Ward [3350m]) [Aug.] (1; CNC), Red Rock Lake ([2900m]) [Aug.] (6; CArm), South St. Vrain Creek ([3050m]) [July] (1; CUB), Yankee Doodle Lake ([3140m]) [July] (1; CArm); Clear Creek Co., Leavenworth Valley (Argentine Road [2740m-3350m], Waldorf Mine [3540m]) [June-July] (19; ANSP, CAS, CNC, DEUN, DHKa, FMNH, MCZ, ROM, UMMZ, USNM), Mount Evans (Echo Lake [3230m],

Summit Lake [3960m]) [July] (3; CAS, CNC), Silver Plume ([2740m-3050m]) [June] (6; ANSP, CAS, MCZ, UWEM); El Paso Co., Gold Camp Road (9 mi. w. of Broadmoor at South Cheyenne Creek [2650m-2740m]) [July-Aug.] (50; DHKa, EAMa); Gilpin Co., Rollinsville area [July] (1; CARM); Jackson Co., Cameron Pass ([3140m]) [Aug.] (1; UASM); Larimer Co., Bennett Creek [May-July] (18; RTBe), Browns Lake Trail [Aug.] (1; RTBe), Buckhorn Creek [July] (2; RTBe), Cameron Pass ([3050m]) [June, Aug.] (6; MSU, RTBe, UASM, USNM), Crown Point Road (at Bennett Springs [2290m-2350m], at Crown Point Trail [3140m-3200m], 40 mi. w. of Bellevue [2740m]) [June-Aug.] (20; DHKa, RTBe, UASM, USNM), Monument Gulch [July] (18; RTBe), North Fork Cache la Poudre River [June] (2; RTBe), Zimmerman Lake [Aug.] (5; RTBe); Park Co., Kenosha Pass [July] (1; CAS); Rocky Mountain National Park, Blue Lake [July] (3; RTBe), Chasm Lake (stream below) [Aug.] (3; CARM), Endovalley Campground [Aug.] (4; RTBe), Fall River ([2620m]) [Aug.] (1; UASM), Hang Lake [Aug.] (1; RTBe), Lake Hiayaha [Aug.] (3; UAFA), Longs Peak ([3050m-3350m] and Boulder Field [3840m], Larkspur Creek) [July-Aug.] (27; CARM, CAS), Thunder Lake ([3080m] and Thunder Lake Trail [2500m-3350m]) [June] (2; CARM); Routt Co., Walton Creek (above Dumont Lake [2900m-2960m]) [Aug.] (3; DHKa). IDAHO: Bear Lake Co., Bloomington Lake (12.1 mi. sw. of Bloomington [2500m-2560m]) [July-Aug.] (27; DHKa, FMNH, UWEM). MONTANA: Carbon Co., Quad Creek (17 mi. sw. of Red Lodge [3050m]) [July] (42; DHKa). NEVADA: Elko Co., Jarbridge [Sept.] (6; NSDA), Lamoille Canyon [June] (1; GRNo), Thomas Creek (at Thomas Creek Campground [2320m-2380m]) [Aug.] (20; DHKa). UTAH: Cache Co., Logan River (13.7 mi. e. of Logan at Cottonwood Creek [1740m]) [Aug.] (22; DHKa), White Pine Lake

([2440m]) [July] (2; CAS); Garfield Co., Cottonwood Peak (38.5 mi. sw. of Antimony at Cottonwood Creek [2440m]) [July] (72; DHKa), Mount Dutton (23.4 mi. sw. of Antimony at North Fork Deep Creek [3120m]) [July] (18; DHKa); Iron Co., Cedar Breaks National Monument ([3200m]) [June-Aug.] (36; CAS, OSUC), Cedar Canyon (Coal Creek [2650m]) [June] (6; DHKa), The Mammoth ([3050m]) [July] (12; ANSP, KSUC, MCZ, UASM, USNM), Parowan Creek (13.5 mi. s. of Parowan [2800m]) [June] (10; DHKa); Kane Co., Long Valley Junction [Aug.] (11; CAS); Salt Lake Co., Alta [June] (68; AMNH, ANSP, CAS, CNC, KSUC, USNM), City Creek Canyon (1; USNM), Lake Catherine ([3020m-3080m]) [Aug.] (1; ANSP); Sevier Co., Monroe Peak (8.6 [2640m] and 12.4 mi. se. of Monroe [2990m]) [July] (3; DHKa), Mount Marvine (0.1 mi. n. of Johnson Valley Reservoir at Severmile Creek [2590m]) [Aug.] (10; DHKa); Tooele Co., Grantsville (12 mi. sw.) [May] (3; MSU); Uintah Co., (5; USNM), Big Brush Creek (7 mi. wnw. of Highway 44 [2620m]) [Aug.] (12; DHKa); Utah Co., American Fork Canyon ([2900m] and 5.1 mi. e. of Highway 146 [1860m], 7 mi. e. of Alpine at Little Mill Campground [1830m]) [Aug.] (27; DHKa, MCZ), Aspen Grove (Provo Canyon [2130m]) [May, Aug.] (3; CAS), Mount Timpanogos (and at Glacier Lake) [July] (44; CAS, MCZ, USNM), North Fork Provo Canyon (1.5 mi. n. of Highway 189 [1680m], Sundance Ski Area [1890m]) [Aug.] (129; DHKa, USNM), Provo Canyon [Apr., June] (12; CAS, CDA, USNM), South Fork American Fork Canyon (6.4 mi. e. of Highway 146 [1980m]) [Aug.] (27; DHKa); Wayne Co., Bluebell Knoll (31 mi. s. of Torrey [2440m-3050m]) [July] (46; DHKa, USNM); County unknown, Wasatch Mountains [June-July] (15; CAS). WYOMING: Albany Co., Brooklyn Lake ([3200m]) [July] (18; DHKa), Centennial [Aug.] (1; MSU), Douglas Creek (1 mi. sse. of Keystone [2440m]) [July] (16; DHKa), Laramie Peak (south slope at Friend Creek

[2440m]) [July] (20; DHKa), Little Brooklyn Lake ([3120m]) [July] (8; DHKa), Snowy Range Pass ([3200m]) [June] (8; UASM); Carbon Co., South Brush Creek (20 mi. se. of Saratoga [2470m]) [July] (1; DHKa), Hidden Treasure Gulch (11.5 mi. wsw of Encampment [2870m]) [July] (2; DHKa), Silver Lake ([3170m]) [July] (2; USNM), Slaughterhouse Gulch (11 mi. sw. of Encampment [2870m]) [July] (6; DHKa); Grand Teton National Park [July] (7; CAS), Death Canyon ([3050m]) [Aug.] (1; ANSP), Mount Teewinot (southeast slope [2160m-2740m]) [Aug.] (27; DHKa), South Fork Cascade Canyon ([3050m-3110m]) [July] (9; CAS, DHKa, DJLa, UASM, USNM); Lincoln Co., White Creek (20 mi. se. of Alpine Junction [1950m-2190m]) [July] (3; DHKa), Wolf Creek (16.1 mi. sw. of Hoback Junction [1770m-1780m]) [July-Aug.] (5; DHKa); Sublette Co., Fremont Lake [July] (1; CAS), Green River Lakes (west shore [2440m-2590m]) [July] (24; DHKa), Hoback River (14 mi. sw. of Highway 187/189 [2440m]) [July] (10; DHKa); Teton Co., Granite Creek (at Little Granite Creek [2150m]) [Aug.] (20; DHKa), Togwotee Pass ([2960m]) [Aug.] (11; DHKa, KUSM); Yellowstone National Park ([2130m-3050m]) [Sept.] (1; MCZ).

Doubtful Records. UNITED STATES OF AMERICA, ARIZONA: Navajo Co., Clay Springs [Sept.] (1; CAS); Pima Co., Hendrichs Canyon (Baboquivari Mountains [980m]) [Sept.] (2; ANSP). COLORADO: La Plata Co., Durango (22 mi. w.) [May] (3; MSU).

No Data. (7; EMUS, USNM).

Nebria trifaria catenata Casey

Specimens examined: 340 (176♂, 164♀)

UNITED STATES OF AMERICA

COLORADO: (12; CAS, ICCM, KSUC, MCZ, USNM); Archuleta Co., Upper San Juan Valley ([2130m-3200m]) [Aug.] (3; MCZ); Chaffee Co., St. Elmo [July] (1; ICCM); Dolores Co., Rico area ([2590m-3050m]) [July] (11; AMNH, ANSP, KUSM, MCZ, OSUC, UMRM); Gunnison Co., Canyon of Big Blue ([2590m]) [July] (1; MCZ); La Plata Co., Durango area ([1680m-2130m]) [July] (1; MSU), Gold King Mill (Tirbircio Creek [2830m]) [Aug.] (1; UASM), Hermosa Creek Trail (nw. of Hermosa [2960m]) [Aug.] (1; UASM); Mineral Co., Wolf Creek Pass ([3510m] and 2 mi. w.) [June, Aug.] (34; CAS, DHKa, EAMa); Montezuma Co., Dolores River (at Highway 145) [Sept.] (1; CAS); Montrose Co., Montrose (and Uncompahgre Plateau [2740m-3050m]) [July] (16; ANSP, KUSM, MCZ, OSUC, UMRM, USNM); Ouray Co., Ouray (and vicinity [2740m-3050m], Box Canyon [2290m-2440m], Toll Road) [July] (3; CAS, USNM); San Juan Co., Silverton area [3050m] [Aug.] (1; MCZ); San Miguel Co., South Fork San Miguel River ([2590m]) [July] (6; ANSP, KUSM, MCZ, OSUC, USNM); County unknown, La Plata Mountains ([2740m-3660m]) [July] (3; CSU, USNM). NEW MEXICO: Lincoln Co., Capitan (1; CUIC).

UTAH: Grand Co., Mill Creek (at Oowah Lake [2680m]) [Aug.] (12; DHKa), Moab area [July] (1; BFCa); San Juan Co., Abajo Peak (13.5 mi. sw. of Monticello [3350m]) [Aug.] (17; UASM), Blue Lake (Geyser Pass) [Aug.] (1; AMNH), Mill Creek Valley ([2900m]) [Aug.] (4; UASM), Monticello (vicinity and 5 mi. w. [2500m], 8.7 mi. w. [3050m], 12.3 mi. w. [2740m]) [July-Aug.] (41; DHKa, MCZ, UASM), Mount Linnaeus (east slope [3050m]) [July] (122; DHKa, USNM), North Creek (7.1 mi. w. of Monticello [2560m-2830m]) [July-Aug.] (38; DHKa, UASM, USNM), Spring Creek ([2590m]) [July] (3; DHKa, USNM).

No Data. (3; ICCM, PURC, USNM).

Nebria trifaria utahensis Kavanaugh, NEW SUBSPECIES

Specimens examined: 15 (10♂, 5♀)

UNITED STATES OF AMERICA

UTAH: Garfield Co., Hanksville (24 mi. s. [2290m]) [July] (3; CNC),
Lonesome Beaver ([2290m]) [July] (12; CAS, CNC).

Nebria vandykei Bänninger

Map: Figure 408

Nebria vandykei vandykei Bänninger

Specimens examined: 161 (70♂, 91♀)

UNITED STATES OF AMERICA

WASHINGTON: Mount Rainier National Park ([1830m]) [Aug.] (4; CUIC, UWBM), Fryingpan Creek ([1160m]) [July] (1; CNC), Nisqually River ([1160m-1420m]) [July] (4; DHKa), North Fork Puyallup River (below toe of Puyallup Glacier [1100m-1650m]) [Aug.] (1; DHKa), Paradise area (Edith Creek Basin [1710m-1920m], Golden Gate [1920m-2000m], Paradise Glacier, Paradise Park [1680m-1830m], Paradise Valley) [July-Aug.] (109; AMNH, CAS, CNC, DHKa, MCZ, UASM, UCD, USNM, UWBM), Sunrise area (east slope of Burroughs Mountain [1890m-1980m]) [Aug.] (3; DHKa), Yakima Park ([2040m]) [July] (1; UIMI); Olympic National Park, Olympic Mountains (1; UWBM); Skamania Co., Mount St. Helens (northeast slope [1520m-1620m], north slope at snowfield below Leschi Glacier [1580m-1680m], north slope at toe of Forsyth Glacier [1620m-1650m]) [Aug.] (27; CAS, DHKa); Whatcom Co., Mount Baker (northeast slope near Heather Meadows area at Austin Pass [1190m-1310m]) [Aug.] (10; CAS, DHKa).

Nebria vandykei wyeast Kavanaugh, NEW SUBSPECIES

Specimens examined: 188 (105♂, 83♀)

UNITED STATES OF AMERICA

OREGON: Deschutes Co., Middle Sister Peak (east slope at North Fork Squaw Creek [1950m-2190m]) [Aug.] (19; CAS, DHKa); Hood River Co., Mount Hood ([1740m] and Hood River Meadows Ski Area [1920m-1950m], Timberline Lodge area [1830m-1950m], Sand Creek) [June-Aug.] (130; CAS, DHKa, UWEM); Marion Co., Mount Jefferson (north slope [1860m-1920m], south end of Jefferson Park [1830m], Russell Creek [1680m-1740m], West Branch Whitewater River [1830m-1890m]) [Aug.] (39; CAS, DHKa, OSUO).

Nebria virescens Horn

Map: Figure 381

Specimens examined: 373 (175♂, 198♀)

CANADA

BRITISH COLUMBIA: (1; MCZ); Vancouver (Stanley Park, Second Beach) [May-July, Sept.-Oct.] (31; DHKa, MCZ, UBC); Vancouver Island (3; AMNH, CNC), Goldenstream Provincial Park [Sept.] (2; USNM), Long Beach (12 mi. s. of Tofino) [May] (2; CNC), Nanaimo [Oct.] (1; USNM), Victoria (and John Dean Park [240m], Mt. Douglas [230m]) [Aug.-Oct.] (8; CNC, DHKa, UASM).

UNITED STATES OF AMERICA

CALIFORNIA: (1; ANSP); Modoc Co., [May] (2; CAS), Devil's Garden District (Modoc National Forest) [June] (9; DHKa, UCB, UWEM), Hilton Spike [June] (1; USNM), Snell Spring (20 mi. ssw. of Alturas) [July] (4; EISc), Willow Ranch (1; USNM); Sequoia National Park, Alta Meadow ([2740m]) [Aug.] (2; CAS); Yosemite National Park, Olmsted Point (1.5 mi. sw. Tenaya Lake on Tioga Road [2560m]) [Nov.] (3; DHKa). IDAHO: Bonner Co., Sagle [Apr.] (1; NMDo), Sandpoint [Apr.] (3; MCZ); Nez Perce Co., Waha [Aug.] (1; UWBM). OREGON: (37; ANSP, CAS, FMNH, ICCM, KUSM, MCZ, OSUC, PADA, UMRM, USNM); Baker Co., Baker Creek [Oct.] (1; UWBM), Dixie area ([1370m]) [June] (1; USNM); Benton Co., Corvallis [Feb., May-June, Oct.-Nov.] (20; CAS, FMNH, OSUO, USNM), Marys Peak [Oct.] (1; OSUO), Philomath (1; USNM), Winkle Lake (10 mi.s. of Corvallis) [Oct.] (1; OSUO); Clatsop Co., Saddle Mountain [June, Oct.] (2; ODA, UWBM); Douglas Co., Drain [June] (1; CAS); Jackson Co., Lake Creek [Mar.] (5; UCD), Medford [Apr.] (1; FMNH), Pinehurst [May] (2; DHKa, JSch); Josephine Co., [June] (1; FMNH); Klamath Co., Bly (11 mi. ne.) [June] (1; JSch), Chiloquin [July] (1; CAS), Gearhart Mountain (at base) [June] (1; JSch), Keno [Apr.] (5; UCD), Linn Co., (1; OSUO), Albany [June-July] (3; MCZ, USNM); Marion Co., Salem [Feb.] (1; USNM); Multnomah Co., Portland [May, Sept.-Oct.] (8; CAS, DHKa, USNM); Umatilla Co., Bingham Springs [May] (1; UIMI), Meacham [May-June] (17; CAS, MCZ, UIMI, UWBM), Langdon Lake [Aug.] (2; UWBM), Tollgate Road ([910m-1220m]) [June, Oct.] (14; CAS, UIMI, USNM, UWBM), Weston [May] (1; UIMI); Union Co., Lookout Creek Trail [Nov.] (4; JSch); Washington Co., Dilley (6; CAS, USNM), Forest Grove [Oct.] (2; ANSP), Gaston (1; CUIC); Yamhill Co.,

McMinnville (2 mi. sw.) [Feb.] (4; CAS). WASHINGTON: (25; ANSP, CAS, DEUN, DHKa, INHS, MCZ, USNM, WSU); Grays Harbor Co., Hoquiam [May] (2; CAS); Island Co., Coupeville [Mar.] (1; JSch); King Co., Kent [Sept.] (2; WSU), Seattle (and Innis Arden) [Mar.-May, July] (24; ICCM, KSUC, MCZ, USNM, UWBM, WSU); Kittitas Co., Ellensburg [May] (1; LRus); Klickitat Co., Bickelton (1 mi. w. at Pine Creek [1010m]) [May] (1; DHKa); Okanogan Co., Bunker Hill Lookout (Pasayten Wilderness [2120m]) (1; OSUO); Pierce Co., Steilacoom (6; UWBM), Tacoma [Sept.] (2; CAS); San Juan Co., San Juan Island [May, July] (4; CAS, UWBM); Skamania Co., Carson (8 mi. n. on Wind River [340m]) [May] (3; DHKa); Spokane Co., Spokane (Spokane Falls) [May] (1; MCZ); Thurston Co., Olympia [Mar., Dec.] (18; CAS, CUIC, MCZ, SDSU, UMMZ, USNM), Tenino [May] (2; USNM); Walla Walla Co., Walla Walla [Sept.] (1; MCZ); Whatcom Co., Kulshan Ridge (ne. slope Mount Baker [1460m-1520m]) [Aug.] (1; DHKa); Whitman Co., Almota (1; JSch), Kamiak Butte State Park ([1040m-1100m]) [Feb.-May, July, Oct.] (14; JSch, NMDo, UCR, UWBM, WSU), Wawawai (and 0.9 mi. e. in Wawawai Canyon) [Apr.-May] (15; CAS, DHKa, JSch, MCZ, USNM, WSU); Yakima Co., Naches [May] (1; UWBM).

No Data. (2; CAS, LEMC).

Nebria zioni Van Dyke

Map: Figure 394

Nebria zioni zioni Van Dyke

Specimens examined: 591 (296♂, 295♀)

UNITED STATES OF AMERICA

UTAH: (1; USNM); Garfield Co., Clay Creek (5.9 mi. se. of Highway 22 [2410m]) [July] (83; DHKa), Mount Dutton (24.3 mi. sw. of Antimony at North Fork Deep Creek [3120m]) [July] (23; DHKa); Iron Co., Cedar Canyon (Highway 14 at Coal Creek [2650m], 28 mi. w. of Long Valley Junction) [June-July] (185; DHKa, USNM), Parowan (2.7 mi. [1920m], 8.3 mi. [2360m], and 13.5 mi. [2800m] s. on Parowan Creek) [June] (56; DHKa), Vermillion Castle Campground [Aug.] (14; UIMI); Piute Co., Mount Belknap (14.1 mi. w. of Marysvale at Beaver Creek [2930m]) [July] (71; DHKa); Sevier Co., Monroe (1.8 mi. [1740m] and 3.3 mi. [1870m] se. on Monroe Creek) [July] (116; DHKa); Zion National Park [May] (21; CAS), Zion Canyon (North Fork Virgin River near The Pulpit [1360m]) [June] (22; DHKa).

Nebria zioni oasis Kavanaugh, NEW SUBSPECIES

Specimens examined: 46 (18♂, 28♀)

UNITED STATES OF AMERICA

UTAH: Washington Co., Leeds Creek (at Oak Grove Campground [1920m-1980m]) [June] (46; DHKa).

APPENDIX C: MATERIAL STUDIED FOR EX-GROUP COMPARISONS

Representatives of the following taxa were studied as part of the cladistic analysis of Nearctic Nebria (see section 4.1).

AMPHIZOIDAE

Amphizoa lecontei Matthew

HYGROBIIDAE

Hygrobia tarda (Herbst)

DYTISCIDAE

Hydroporus clypealis Sharp

HALIPLIDAE

Peltodytes simplex (LeConte)

GYRINIDAE

Dineustus nigrior Roberts

CARABIDAE

Trachypachus gibbsi LeConte (Trachypachini)

Systolosomus brevis Solier (Trachypachini)

Gehringia olympica Darlington (Gehringiini)

Rhysodes hamatus LeConte (Rhysodini)

Pseudomorpha angustata Horn (Pseudomorphini)

Metrius contractus Eschscholtz (Metriini)

Mystropomus subcostatus Solier (Ozaenini)

Pachyteles marginicollis Solier (Ozaenini)

Crepidogaster sp. (Crepidogastrini)

Pheropsophus sp. (Brachinini)
Brachinus pallidus Erwin (Brachinini)
Amblycheila cylindriformis (Say) (Cicindelini)
Omus californicus Eschscholtz (Cicindelini)
Megacephala carolina (Linnaeus)
Pogonostoma chalybaeum Klug (Cicindelini)
Oxychila femoralis Laporte (Cicindelini)
Cicindela hirticollis Say (Cicindelini)
Calosoma scrutator Fabricius (Carabini)
Carabus chamissonis Fischer von Waldheim (Carabini)
Ceroglossus sp. (Carabini)
Cychrus hemphili Horn (Cychrini)
Sphaeroderus canadensis Chaudoir (Cychrini)
Scaphinotus vandykei Roeschke (Cychrini)
Scaphinotus interruptus Menetries (Cychrini)
Pamborus guerini Gory (Pamborini)
Enceladus gigas Bonelli (Siagonini)
Luperca laevigata (Fabricius) (Siagonini)
Siagona depressa (Fabricius) (Siagonini)
Opisthius richardsoni Kirby (Opisthiini)
Paropisthius indicus (Chaudoir) (Opisthiini)
Notiophilus borealis Harris (Notiophilini)
Pelophila borealis (Paykull) (Nebriini)
Pelophila rudis (LeConte) (Nebriini)
Leistus nubivagus Wollaston (Nebriini)
Leistus spinibarbis (Fabricius) (Nebriini)
Leistus ferruginosus Mannerheim (Nebriini)

- Leistus gracilis Fuss (Nebriini)
Leistus nitidus Duftschmid (Nebriini)
Leistus depressus Breit (Nebriini)
Leistus juldusianus Reitter (Nebriini)
Leistus rufescens (Fabricius) (Nebriini)
Leistus piceus Frölich (Nebriini)
Nebria fuscipes Fuss (Nebriini)
Nebria hellwigi (Panzer) (Nebriini)
Nebria komarovi Semenov and Znojko (Nebriini)
Nebria djakonovi Semenov and Znojko (Nebriini)
Nebria nakanei Ueno (Nebriini)
Nebria oxyptera Daniel (Nebriini)
Nebria psammodes Rossi (Nebriini)
Nebria complanata (Linnaeus) (Nebriini)
Nebria brevicollis (Fabricius) (Nebriini)
Nebria laticollis Dejean (Nebriini)
Nebria livida (Linnaeus) (Nebriini)
Nebria castanea Bonelli (Nebriini)
Nebria coreica Solsky (Nebriini)
Nebria desgodinsi Oberthür (Nebriini)
Nebria elegans Andrewes (Nebriini)
Nebria superna Andrewes (Nebriini)
Nebria nudicollis Peyerimhoff (Nebriini)
Omophron obliteratum Horn (Omophronini)
Hiletus fissipennis Ancey (Hiletini)
Hiletus versutus Schiötte (Hiletini)
Diachila arctica (Gyllenhal) (Elaphrini)

Blethisa multipunctata (Linnaeus) (Elaphrini)

Elaphrus californicus Mannerheim (Elaphrini)

Migadops bimaculata Reed (Migadopini)

Monolobus testaceus Solier (Migadopini)

Loricera pilicornis (Fabricius) (Loricerini)

Bembidion planatum LeConte (Bembidiini)

Patrobus longicornis Say (Patrobini)

Agonum maculicolle Dejean (Pterostichini)

Pterostichus adstrictus Eschscholtz (Pterostichini)

Calathus advena LeConte (Pterostichini)

AUTOBIOGRAPHY

I was born April 7, 1945 in San Francisco, California. The oldest of four boys, my childhood years were spent in Alameda and Redwood City, California where I received my elementary education. During this period, my interest in biology and the outdoors began and was encouraged by my parents who provided me with stimulating experiences on family vacations and outings and contact with others with common interests through the Cub and Boy Scouts. Perhaps most important was their tolerance of my sudden and prolonged disappearances from family outings--times when I would wander off fully absorbed by the beauty and detail of the living natural world. With but mild complaints, they also accepted the assorted reptilian, amphibian and invertebrate house guests I would bring back as "pets."

Our family moved to San Jose, California in 1959 where I completed my secondary education. I entered San Jose State University in 1963 as a pre-med student, majored in biological sciences and received a Bachelor of Arts degree in May, 1967. My interests were focused on entomology during a required course in general entomology taught by J. Gordon Edwards and William E. Ferguson. Their intense enthusiasm proved contagious and I subsequently enrolled in several elective entomology courses. I later became a student assistant with the insect collection where I met Terry L. Erwin, then completing his Master's thesis, who further channeled my interest toward the study of carabid beetles.

Following acceptance by the University of Colorado School of Medicine, I moved to Denver in 1967. I completed two years in

medicine before deciding to pursue a career in systematic entomology. I transferred to the Graduate School at the Denver Center of the University in September, 1969 and received a Master of Arts degree in May, 1970. I entered a Ph.D. program at the University of Alberta in July, 1970, with Dr. George E. Ball as my sponsor and program advisor. Based initially on my collecting experiences in the Rocky Mountains of Colorado, I decided to attempt systematic studies on the carabid genus Nebria for my doctoral dissertation project.

In April, 1974, prior to completion of my doctoral program, I accepted a position at the California Academy of Sciences, San Francisco, as Acting Assistant Curator of Entomology, the position I hold at present.

I met my wife, Beverly, in 1963 during our senior year of high school. We were married in September, 1965, following our second year in college, and now have five children who share our life together.

Following completion of the dissertation, I plan to continue systematic studies on the World nebrine fauna and expand my studies on the evolution and biogeography of high altitude faunas, with emphasis on Carabidae, Amphizoidae and certain silphoid and staphylinoid genera.

FIGURES

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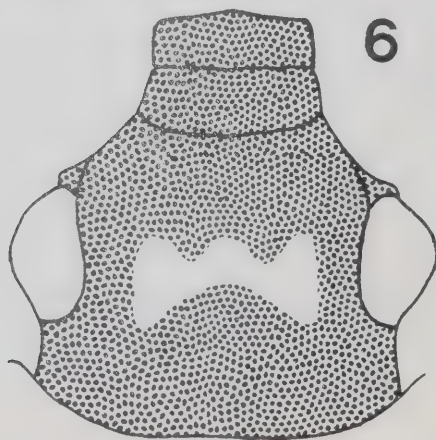
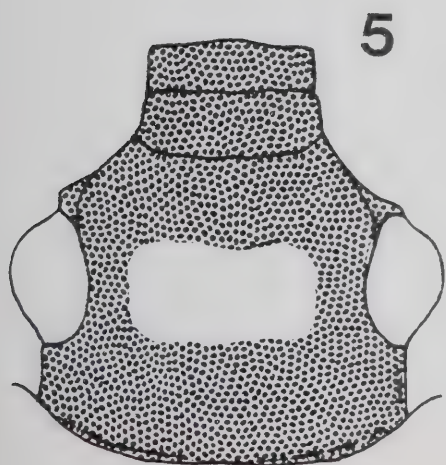
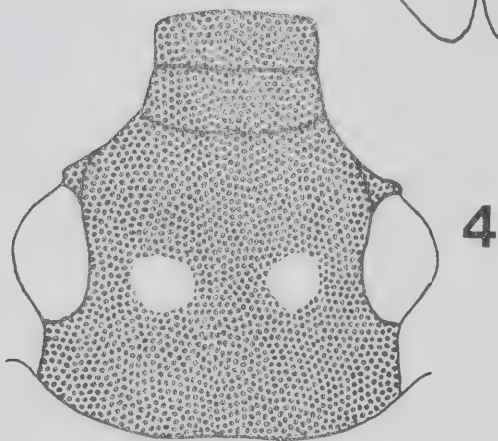
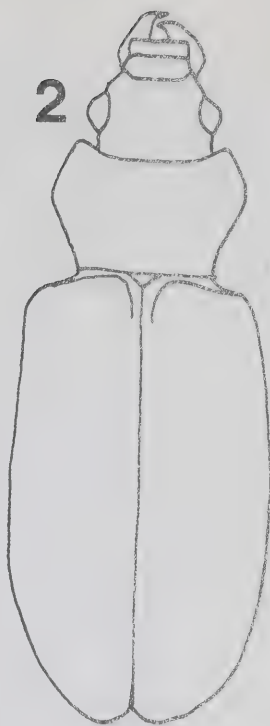
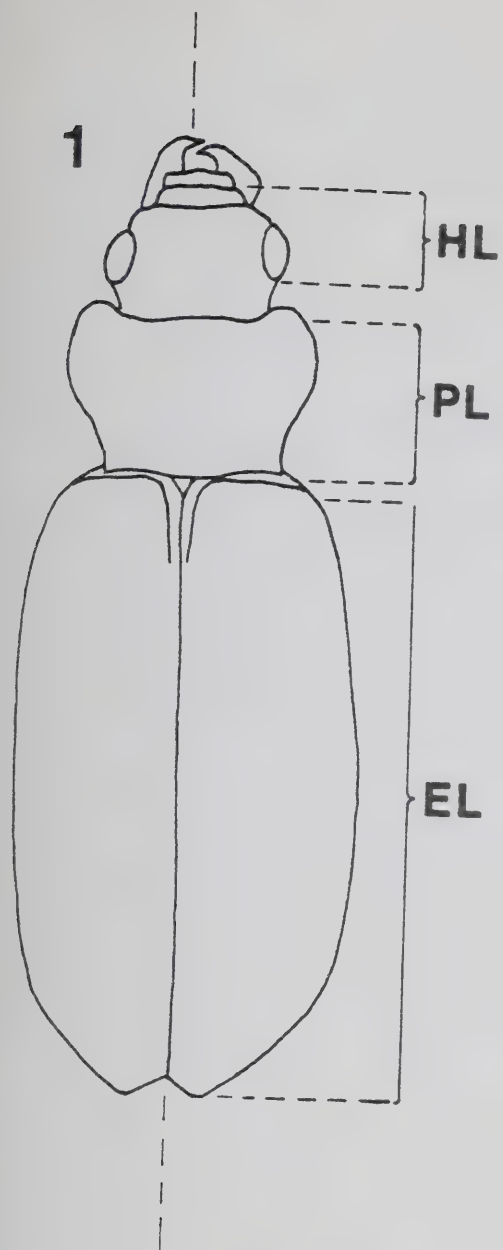
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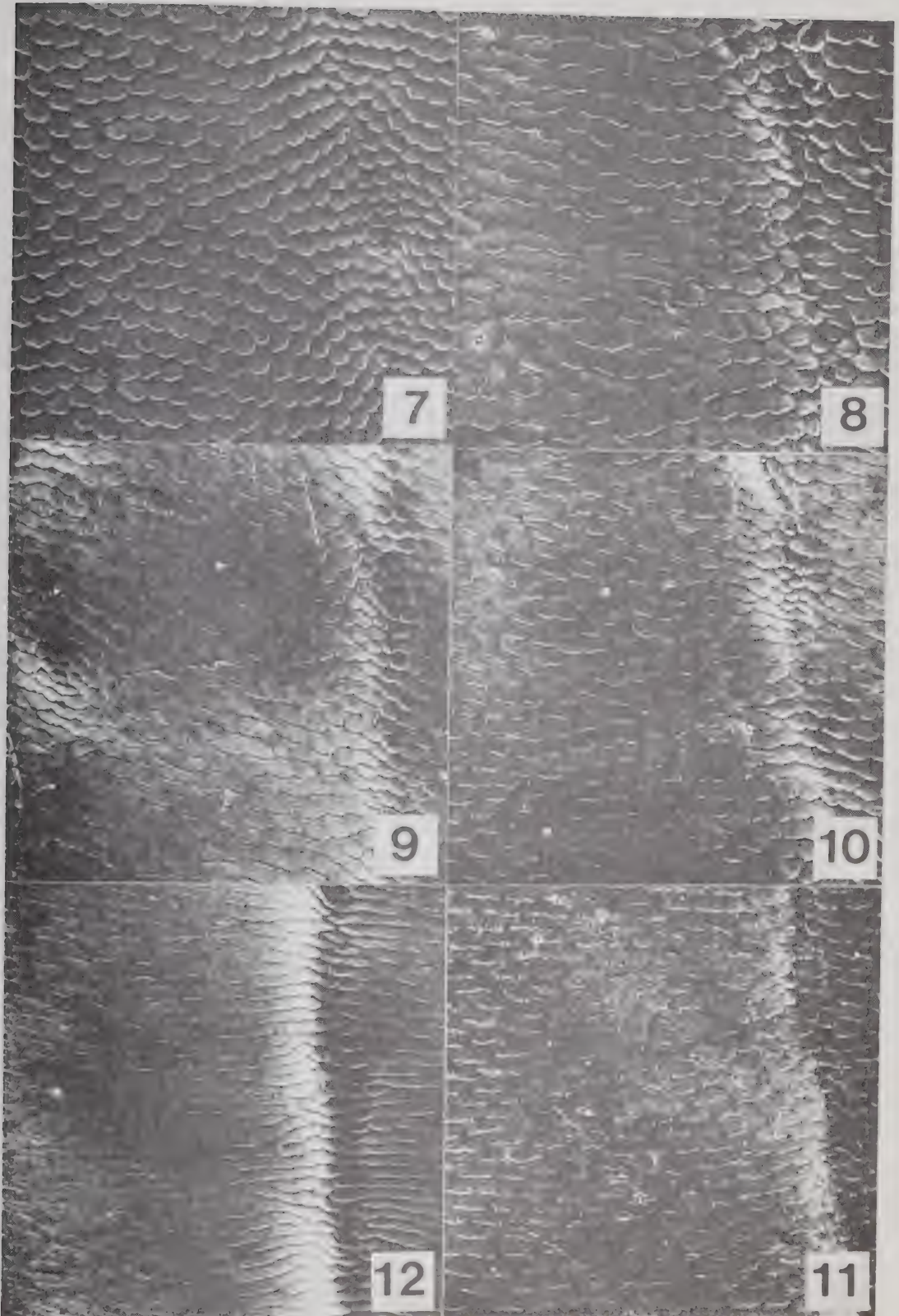
Fig. 1. Components of standardized body length; HL = head length; PL = pronotal length; EL = elytral length. Figs. 2 - 3. Habitus: general body form. 2. Type ailé. 3. Type aptère. Figs. 4 - 6. Generalized head, illustrating frontal pale spot(s). 4. Spots separate, distinct. 5. Spots broadly fused. 6. Spots narrowly fused to form M-shape.





Figs. 7 - 12. Elytral microsculpture. 7. Nebria darlingtoni new species (Kyburz, California). 8. Nebria diversa LeConte (Waldport, Oregon). 9. Nebria appalachia Darlington (Soco Gap, North Carolina). 10. Nebria hudsonica LeConte (Penticton, British Columbia). 11. Nebria gregaria Fischer von Waldheim (Dutch Harbor, Unalaska Island, Alaska). 12. Nebria lacustris lacustris Casey (Ithaca, New York).

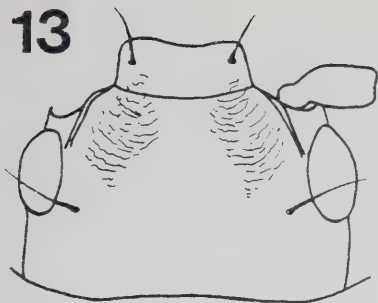
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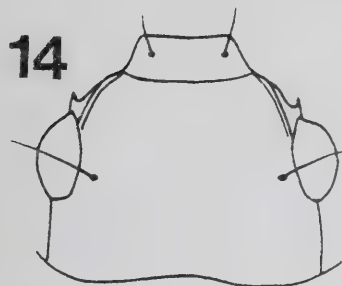


Figs. 13 - 21. Head, dorsal aspect. 13. Nebria crassicornis
crassicornis Van Dyke (Mount Rainier, Washington). 14. Nebria
crassicornis intermedia Van Dyke (Terrace, British Columbia). 14A.
Nebria gyllenhali castanipes (Kirby) (Dry Wolf Creek, Montana). 15.
Nebria gregaria Fischer von Waldheim (Dutch Harbor, Unalaska Island,
Alaska). 16. Nebria charlottae Lindroth (Masset, Queen Charlotte
Islands, British Columbia). 17. Nebria appalachia Darlington
(Newfound Gap, North Carolina). 18. Nebria gebleri gebleri Dejean
(Dry Wolf Creek, Montana). 19. Nebria ovipennis LeConte (Mount
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(Franklin Lakes, California). 21. Nebria metallica Fischer von
Waldheim (Manning Provincial Park, British Columbia). Scale line =
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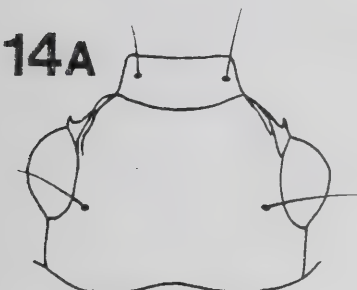
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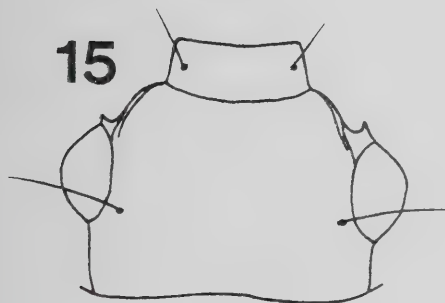
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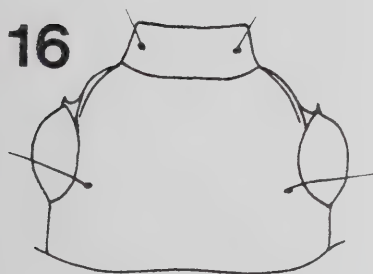
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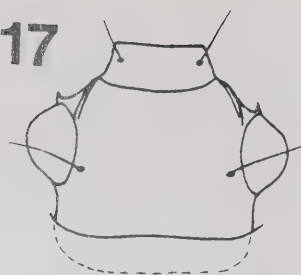
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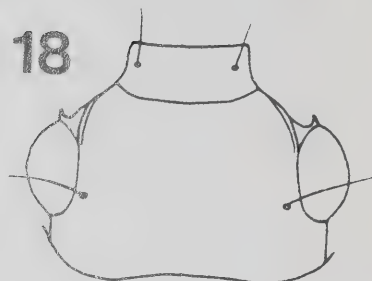
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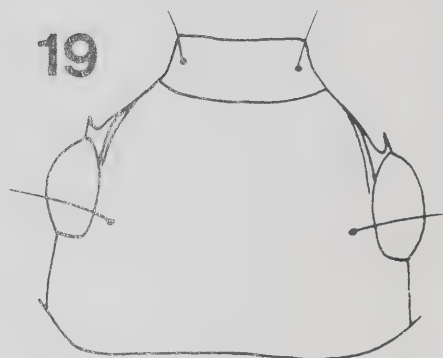
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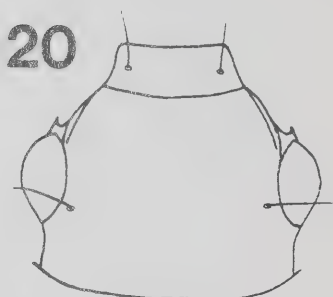
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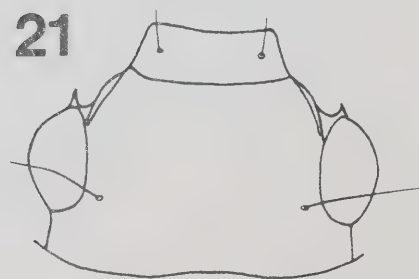
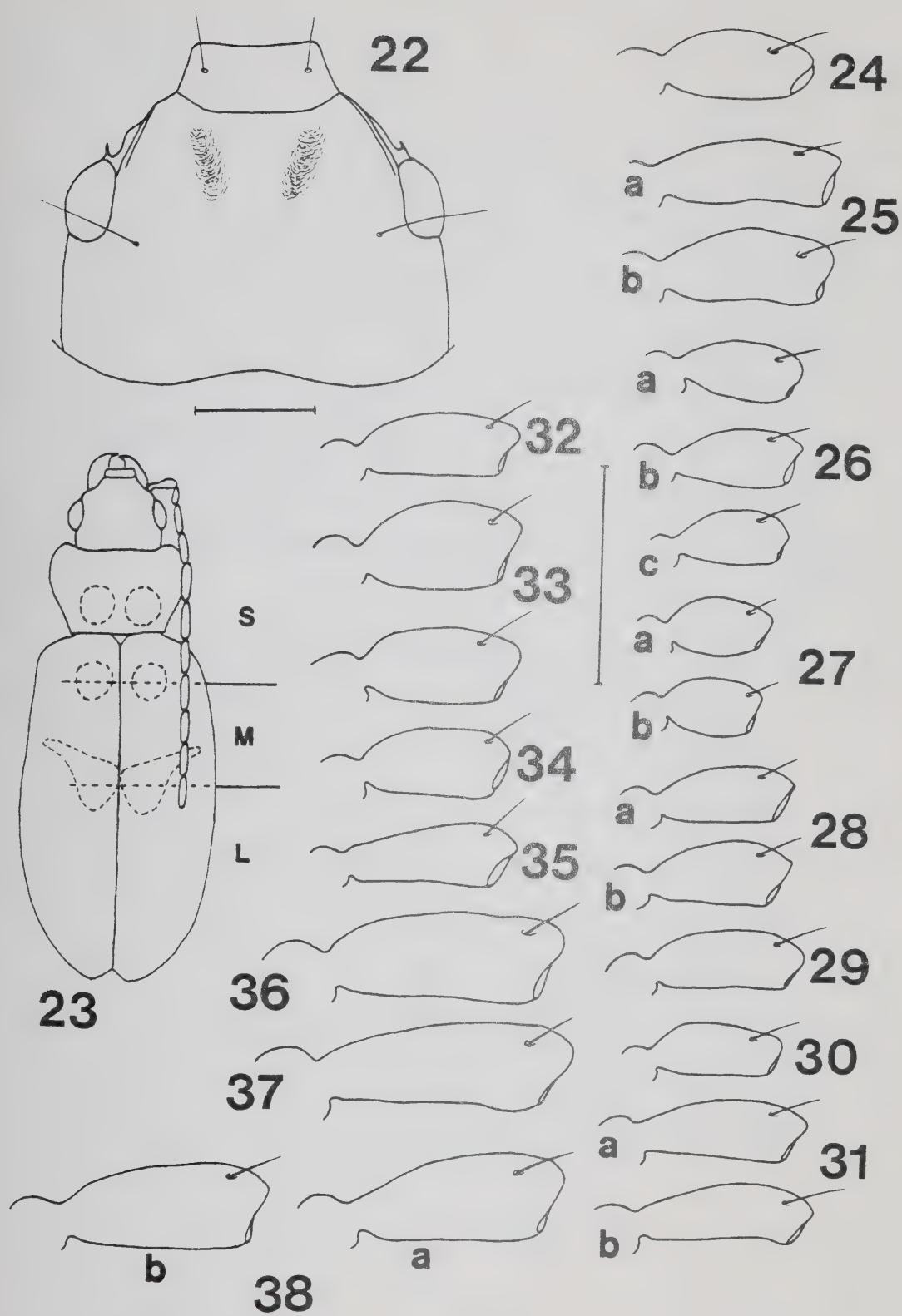
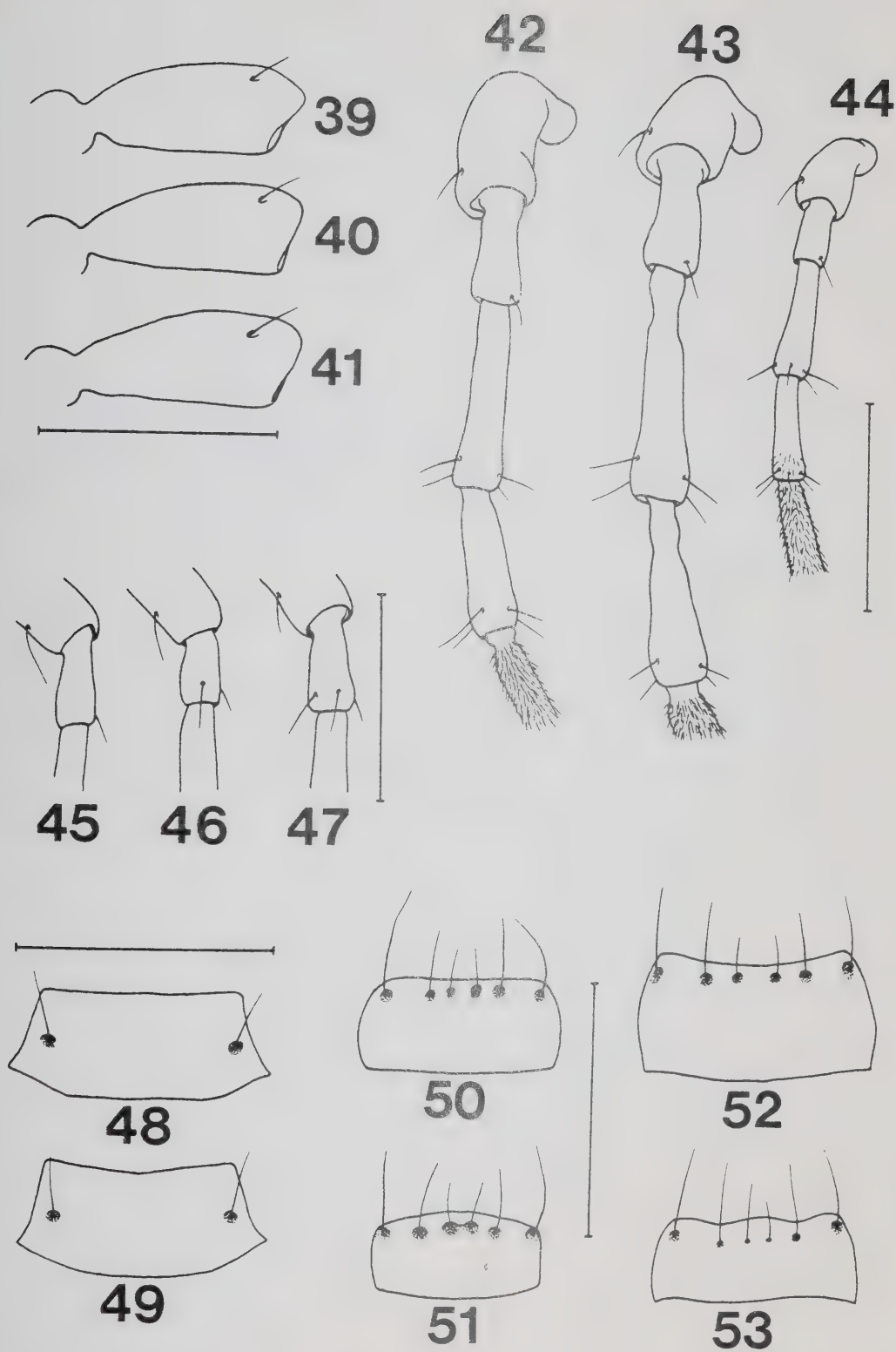


Fig. 22. Head, dorsal aspect, Nebria ingens ingens Horn (Mount Whitney, California). Fig. 23. Relative measure of antennal length (dorsal aspect); S = range of lengths termed "short"; M = range of lengths termed "medium"; L = range of lengths termed long; outlines of coxa represented by broken lines. Figs. 24 - 38. Right antennal scape, dorsal aspect. 24. Nebria gouleti new species (Underwood, Washington). 25. Nebria hudsonica LeConte ([a] Thunder Bay, Ontario; [b] Ellensburg, Washington). 26. Nebria gyllenhali castanipes (Kirby) ([a] Calling Lake, Alberta; [b] Mount Washington, New Hampshire; [c] Bumping River, Washington). 27. Nebria gyllenhali lassenensis new subspecies ([a] Mount Lassen, California; [b] Todd Lake, Oregon). 28. Nebria gyllenhali lindrothi new subspecies ([a] Brooklyn Lake, Wyoming; [b] Rio Puerco, New Mexico). 29. Nebria lyelli Van Dyke (Mount Lyell, California). 30. Nebria arkansana uinta new subspecies (Lost Lake, Utah). 31. Nebria zioni zioni Van Dyke ([a] Zion National Park, Utah; [b] Tushar Mountains, Utah). 32. Nebria zioni oasis new subspecies (Pine Valley Mountains). 33. Nebria ovipennis LeConte ([a] Yuba Pass, California; [b] Franklin Lakes, California). 34. Nebria spatulata spatulata Van Dyke (Franklin Lakes, California). 35. Nebria spatulata sierrae new subspecies (Big Horn Lake, California). 36. Nebria vandykei vandykei Bänninger (Mount St. Helens, Washington). 37. Nebria vandykei wyeast new subspecies (Mount Hood, Oregon). 38. Nebria trifaria trifaria LeConte ([a] Ward, Colorado; [b] Cedar Canyon, Utah). All scale lines = 1.0 mm.



Figs. 39 - 41. Right antennal scape, dorsal aspect. 39. Nebria trifaria catenata Casey (Wolf Creek Pass, Colorado). 40. Nebria coloradensis Van Dyke (Hoosier Pass, Colorado). 41. Nebria piute Bail and Erwin (Circleville Mountain, Utah). Figs. 42 - 44. Basal antennomeres, right antenna, lateral aspect. 42. Nebria purpurata LeConte (Rio Puerco, New Mexico). 43. Nebria ingens ingens Horn (Mount Whitney, California). 44. Nebria virescens Horn (Mount Baker, Washington). Figs. 45 - 47. Right antennal pedicel, anteriodorsal oblique aspect. 45. Nebria virescens Horn (Vancouver, British Columbia). 46. Nebria nivalis nivalis (Paykull) (Lake Harbour, Baffin Island). 47. Nebria nivalis nivalis (Paykull) (Lake Harbour, Baffin Island). Figs. 48 - 49. Clypeus, dorsal aspect. 48. Nebria desolata Kavanaugh (11 mi. se. of Boulder, Utah). 49. Nebria hudsonica LeConte (Woods Landing, Wyoming). Figs. 50 - 53. Labrum, dorsal aspect. 50. Nebria pallipes Say (Ithaca, New York). 51. Nebria hudsonica LeConte (Woods Landing, Wyoming). 52. Nebria ingens ingens Horn (Mount Whitney, California). 53. Nebria gregaria Fischer von Waldheim (Dutch Harbor, Unalaska Island, Alaska). All scale lines = 1.0 mm.



Figs. 54 - 56. Left mandible. 54. Nebria virescens Horn (Vancouver, British Columbia); [a] dorsal aspect; [b] ventral aspect. 55. Nebria vandykei vandykei Bänninger (Mount Rainier, Washington), dorsal aspect. 56. Nebria nitidula (Fabricius) (Ulan Batar, Mongolia); [a] dorsal aspect; [b] ventral aspect. Figs. 57 - 58. Right mandible. 57. Nebria virescens Horn (Vancouver, British Columbia); [a] dorsal aspect; [b] ventral aspect. 58. Nebria nitidula (Fabricius) (Ulan Batar, Mongolia); [a] dorsal aspect; [b] ventral aspect. Scale line = 1.0 mm.

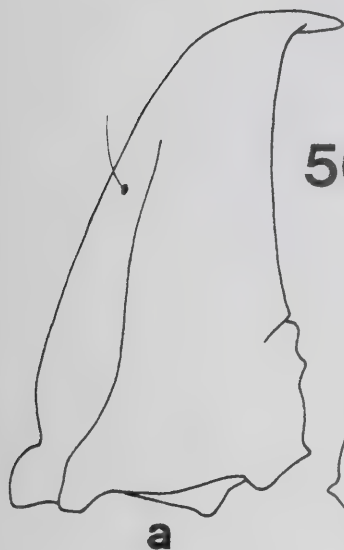
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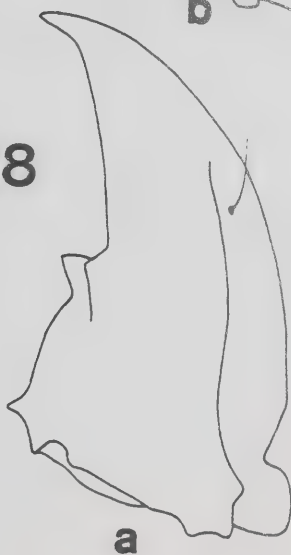
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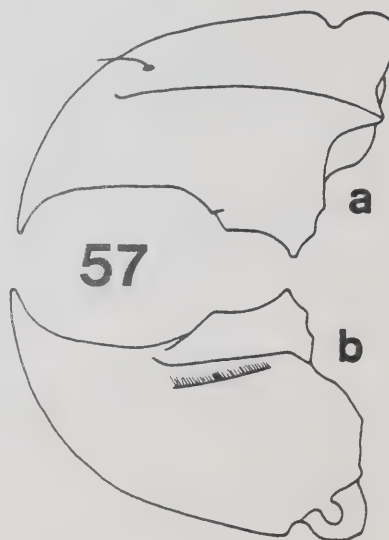
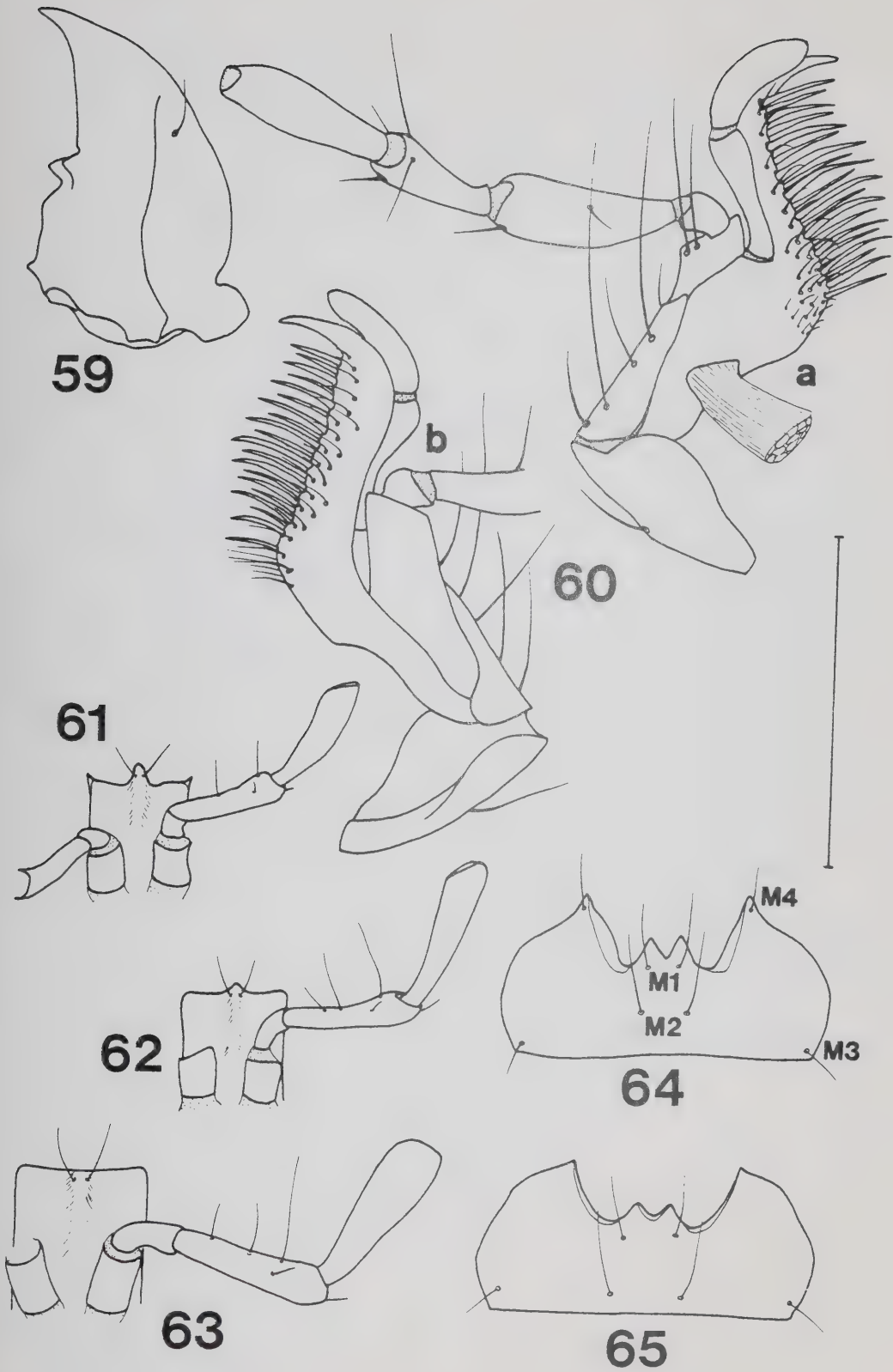
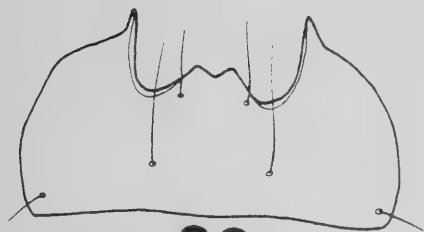
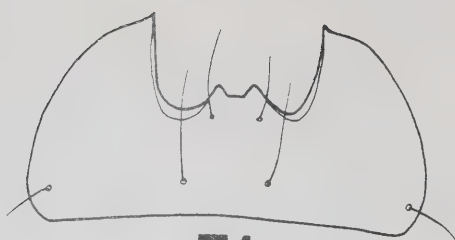
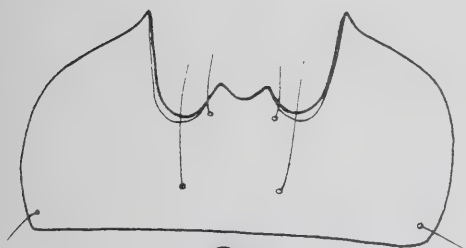
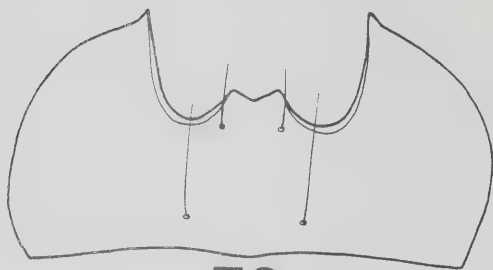
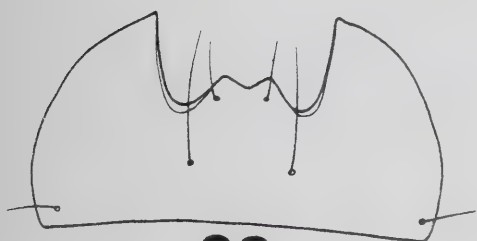
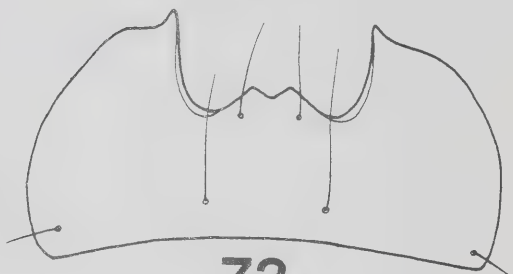
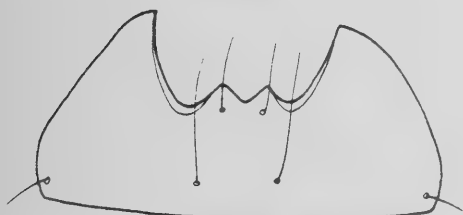
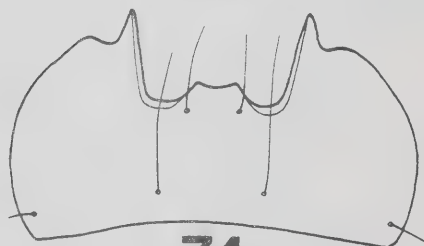
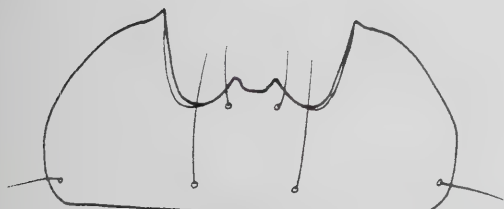
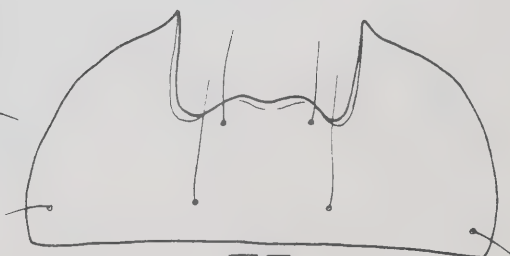


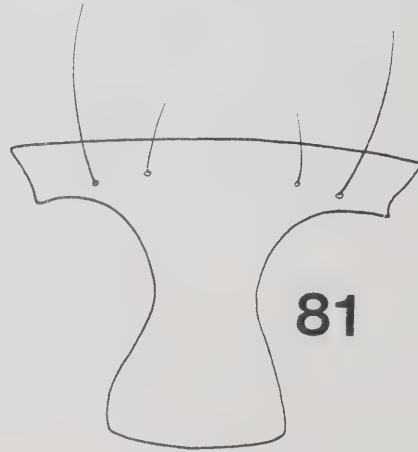
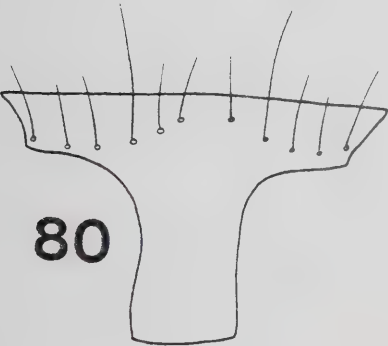
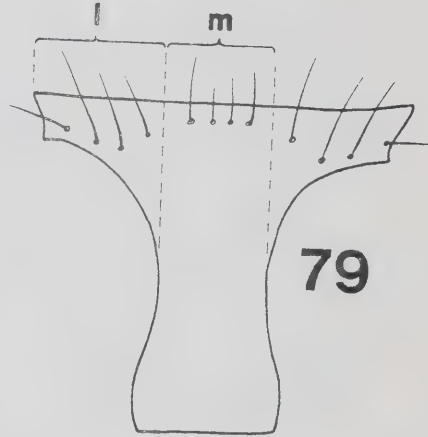
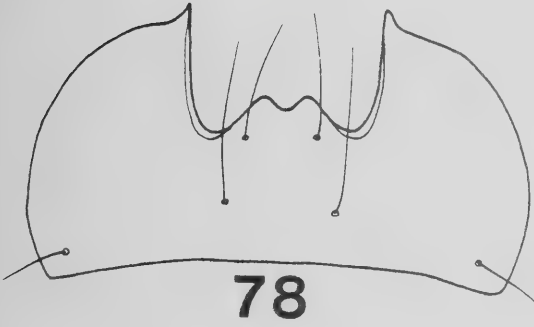
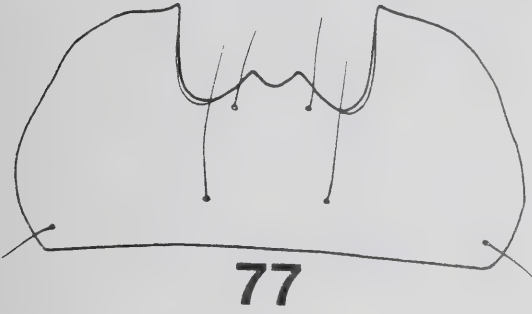
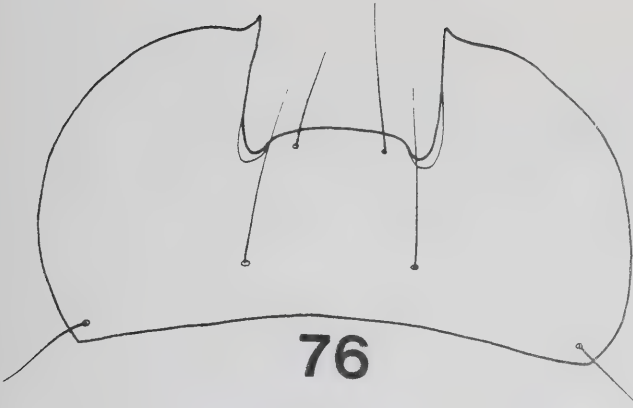
Fig. 59. Right mandible, dorsal aspect, Nebria appalachia Darlington (Soco Gap, North Carolina). Fig. 60. Right maxilla, Nebria brevicollis (Fabricius) (Hexampshire, England); [a] ventral aspect; [b] dorsal aspect. Figs. 61 - 63. Labium, ventral aspect. 61. Nebria virescens Horn (Vancouver, British Columbia). 62. Nebria hudsonica LeConte (Green River Lakes, Wyoming). 63. Nebria ingens ingens Horn (Mount Whitney, California). Figs. 64 - 65. Mentum, ventral aspect. 64. General form and chaetotaxy; setae described in text. 65. Nebria hudsonica LeConte (Green River Lakes, Wyoming). All scale lines = 1.0 mm.



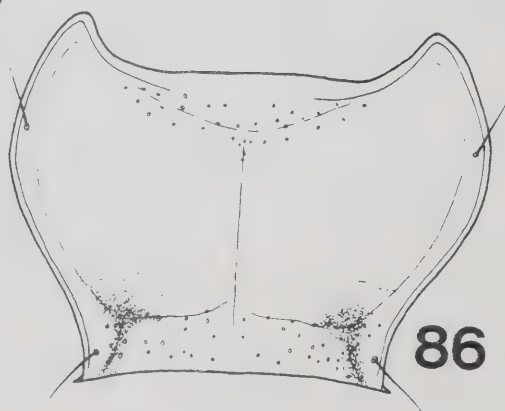
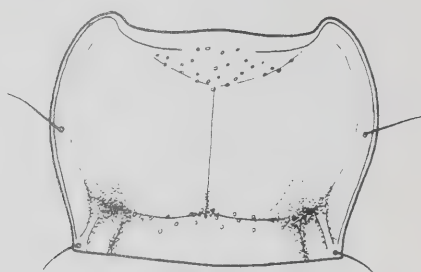
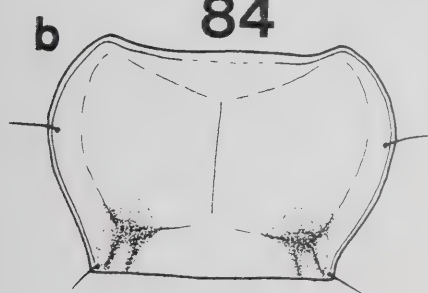
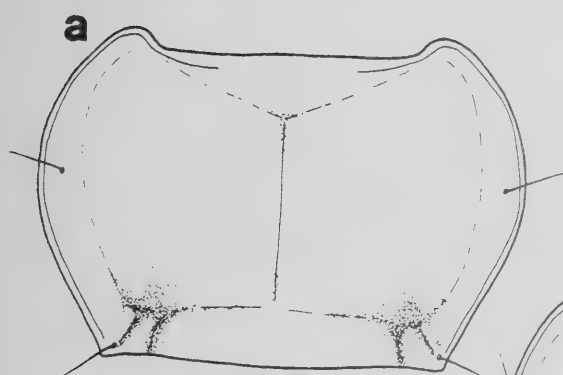
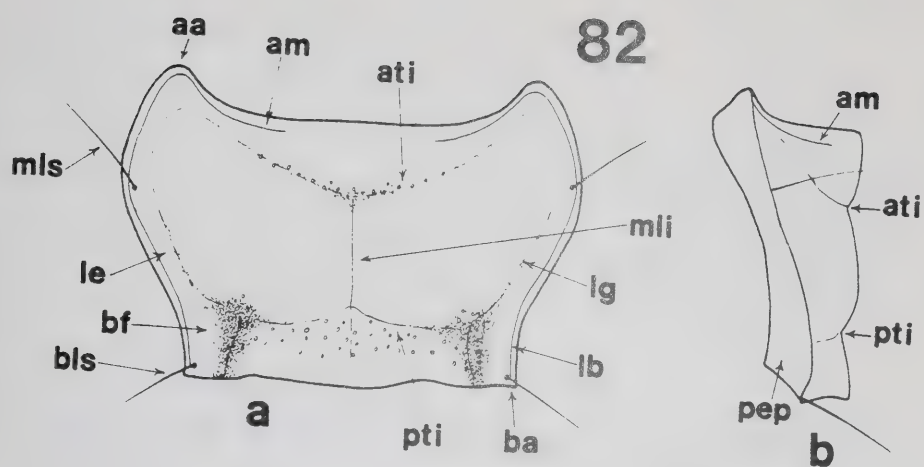
Figs. 66 - 75. Mentum, ventral aspect. 66. Nebria lyelli Van Dyke (Mount Lyell, California). 67. Nebria gregaria Fischer von Waldheim (Dutch Harbor, Unalaska Island, Alaska). 68. Nebria charlottae Lindroth (Masset, Queen Charlotte Islands, British Columbia). 69. Nebria obliqua LeConte (Hardin, Wyoming). 70. Nebria mannerheimii Fischer von Waldheim (Oakridge, Oregon). 71. Nebria desolata Kavanaugh (11 mi. se. of Boulder, Utah). 72. Nebria carri new species (Dollarhide Summit, Idaho). 73. Nebria kincaidi kincaidi Schwarz (Prince Rupert, British Columbia). 74. Nebria spatulata spatulata Vas Dyke (Franklin Lakes, California). 75. Nebria ovipennis LeConte (Mount Rose Pass, Nevada). Scale line = 1.0 mm.

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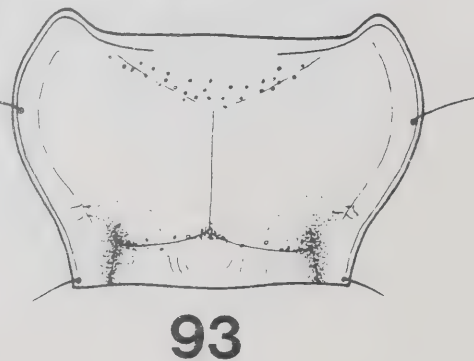
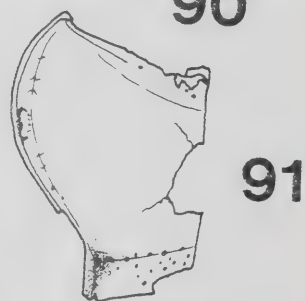
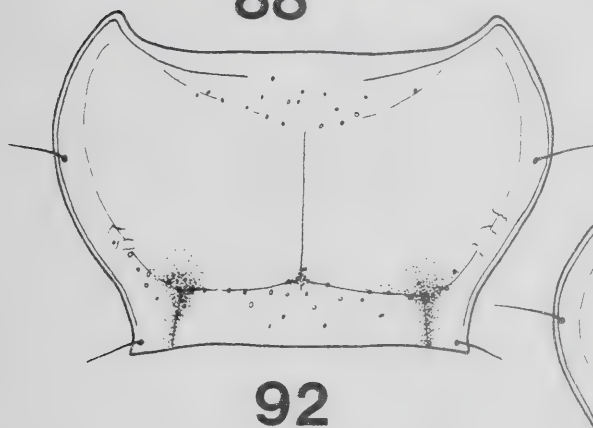
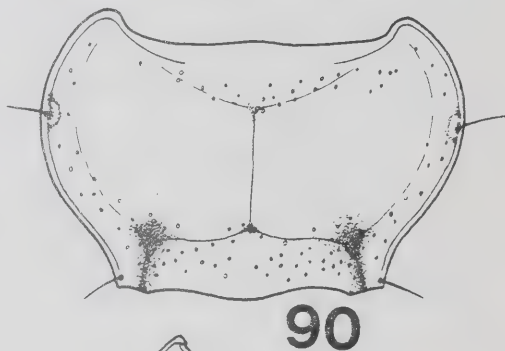
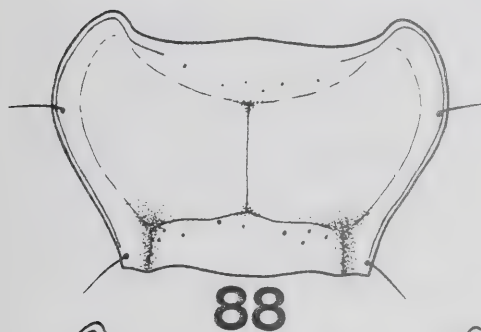
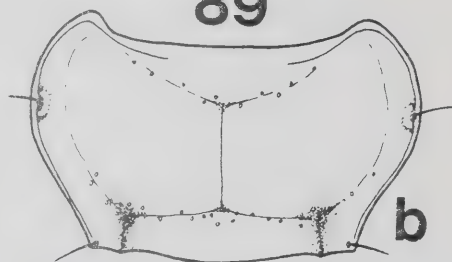
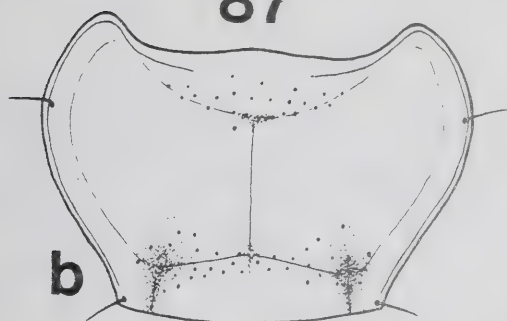
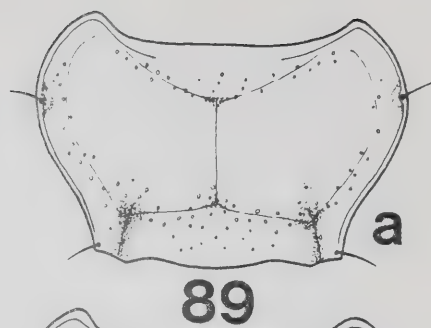
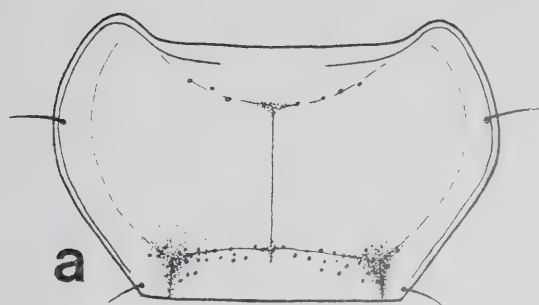
Figs. 76 - 78. Mentum, ventral aspect. 76. Nebria ingens ingens Horn (Mount Whitney, California). 77. Nebria trifaria trifaria LeConte (Laramie Peak, Wyoming). 78. Nebria trifaria catenata Casey (Wolf Creek Pass, Colorado). Figs. 79 - 81. Gula, ventral aspect. 79. General form and chaetotaxy; l = lateral setae; m = medial setae. 80. Nebria zioni zioni Van Dyke (Zion National Park, Utah). 81. Nebria purpurata LeConte (Rio Puerco, New Mexico). Scale line = 1.0 mm.



Figs. 82 - 83. Pronotum, general form and associated terms. 82. [a] dorsal aspect; [b] lateral aspect. 83. Transverse cross-section. Abbreviation code: aa = apical angle; am = apical margination; ati = anterior transverse impression; ba = basal angle; bf = basal fovea; bls = basolateral seta; lb = lateral bead (=lateral margination); le = lateral explanation; lg = lateral groove; mli = median longitudinal impression; mls = midlateral seta; pep = proepipleuron; pti = posterior transverse impression. Figs. 84 - 86. Pronotum, dorsal aspect. 84. Nebria virescens Horn ([a] Vancouver, British Columbia; [b] Bunker Hill Lookout, Washington). 85. Nebria chalceola Bates (Fujiyama, Honshu, Japan). 86. Nebria paradisi Darlington (Mount Rainier, Washington). Scale line = 1.0 mm.

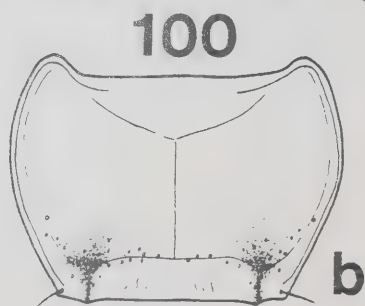
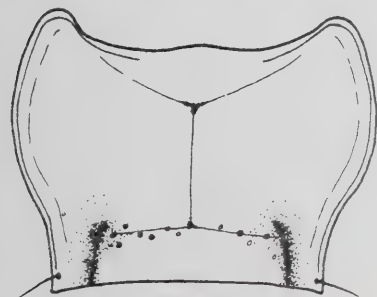
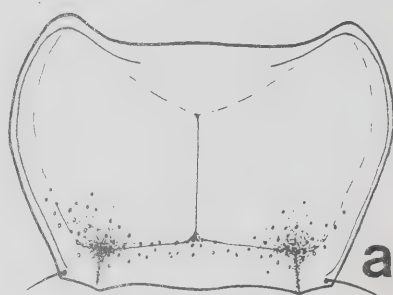
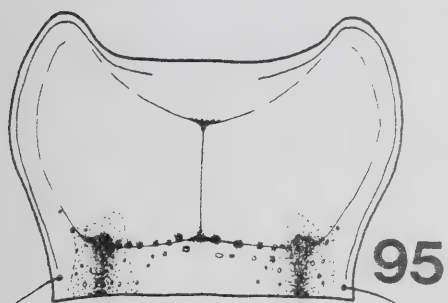
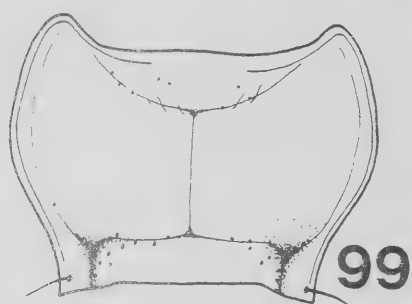
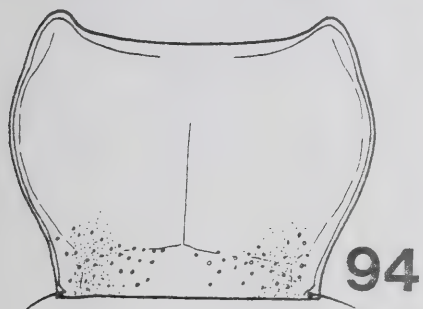
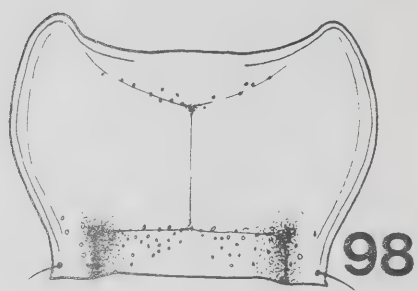
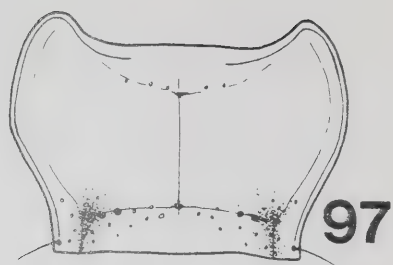
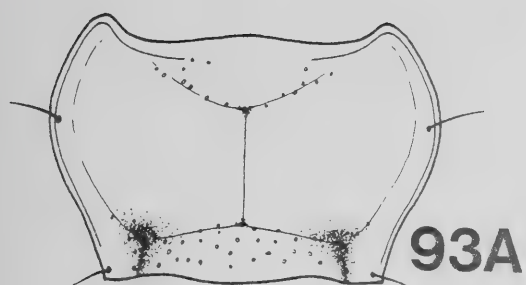


Figs. 87-93. Pronotum, dorsal aspect. 87. Nebria lacustris lacustris Casey ([a] Bayfield, Wisconsin; [b] Stowe, Vermont). 88. Nebria lacustris bellorum new subspecies (Great Balsam Mountains, North Carolina). 89. Nebria nivalis nivalis Paykull ([a] Aklavik, Northwest Territories; [b] Lake Harbour, Baffin Island). 90. Nebria nivalis gaspesiana new subspecies (Mont Albert, Québec). 91. Fossil specimen, nivalis subgroup (Lava Camp, Seward Peninsula, Alaska; ca. 5.7 million years B.P. [J. V. Matthews, personal communication]). 92. Nebria crassicornis crassicornis Van Dyke (Mount Rainier, Washington). 93. Nebria crassicornis intermedia Van Dyke (Glacier National Park, Montana). Scale line = 1.0 mm.



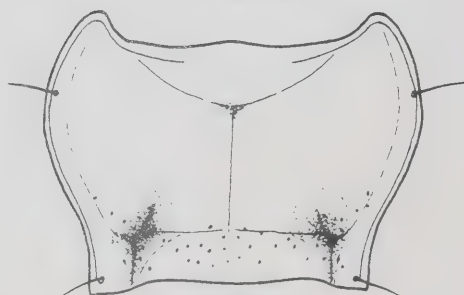
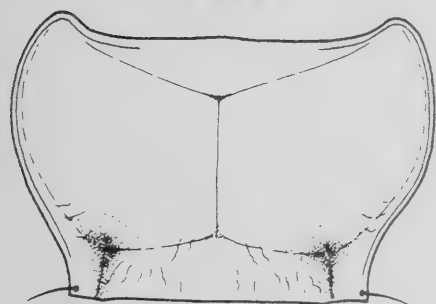
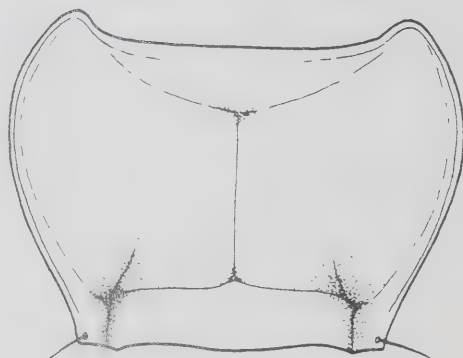
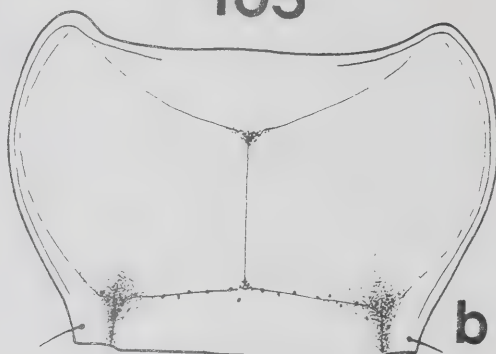
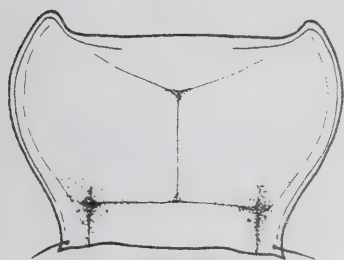
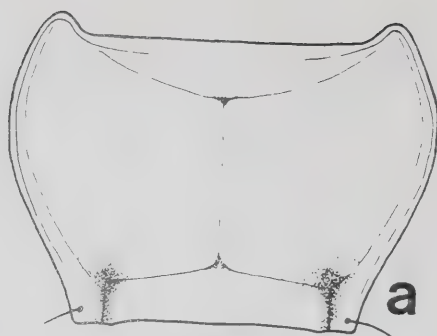
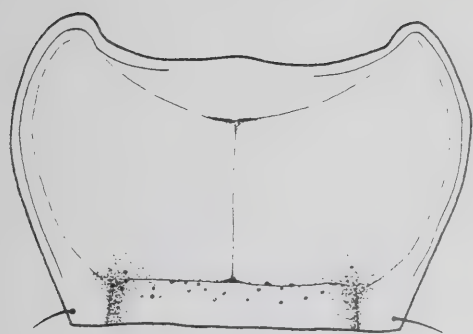


Figs. 93A-100. Pronotum, dorsal aspect. 93A. Nebria gyllenhali castanipes (Kirby) (Mount Washington, New Hampshire). 93B. Nebria gyllenhali lindrothi new subspecies (Wheeler Peak, New Mexico). 94. Nebria lyelli Van Dyke (Mount Lyell, California). 95. Nebria acuta acuta Lindroth (Mount Rainier, Washington). 96. Nebria acuta quileute new subspecies (Olympic Hot Springs, Washington). 97. Nebria sahlbergii modoc new subspecies (Warner Mountains, California). 98. Nebria sahlbergii triad new subspecies (Trinity Alps, California). 99. Nebria zioni zioni Van Dyke (Escalante Mountains, Utah). 100. Nebria suturalis LeConte ([a] Athabasca Glacier, Alberta; [b] Quandary Peak, Colorado). Scale line = 1.0 mm.

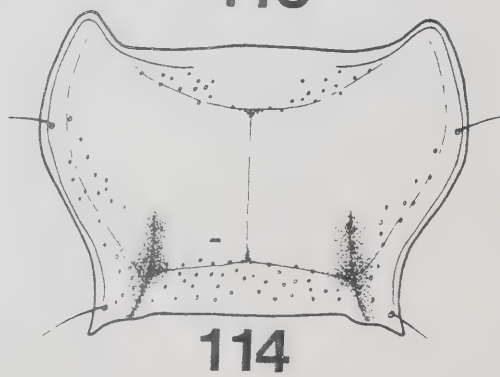
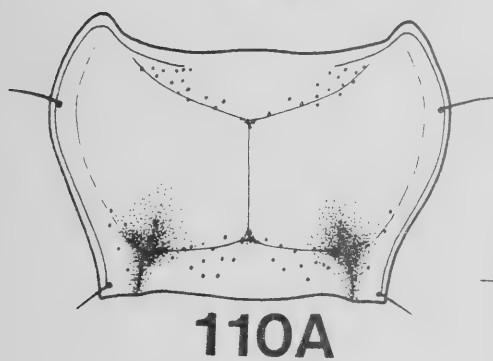
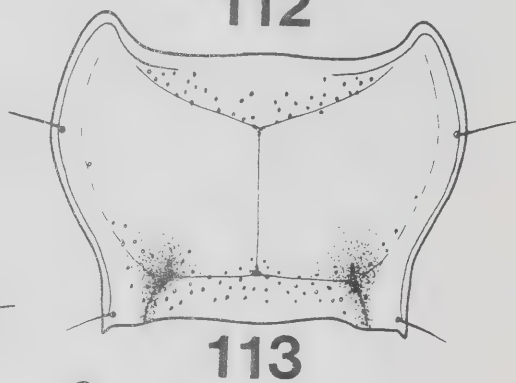
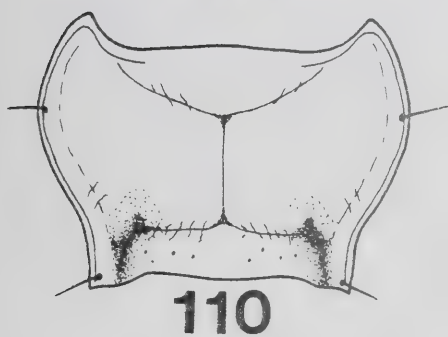
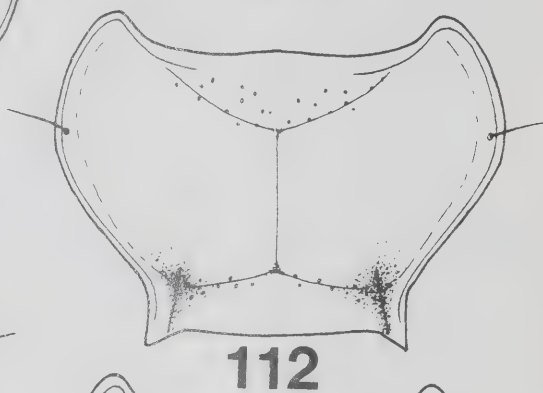
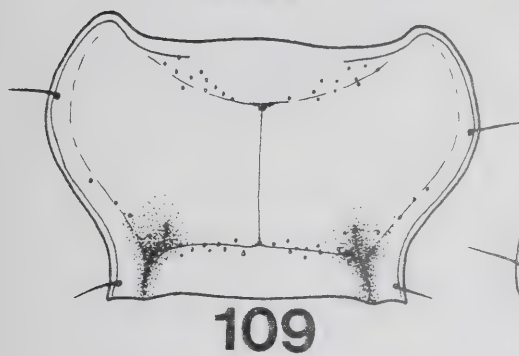
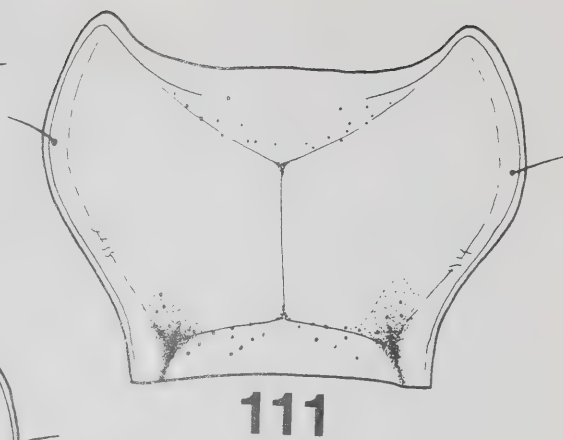
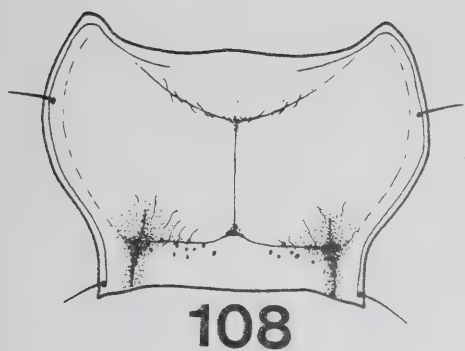




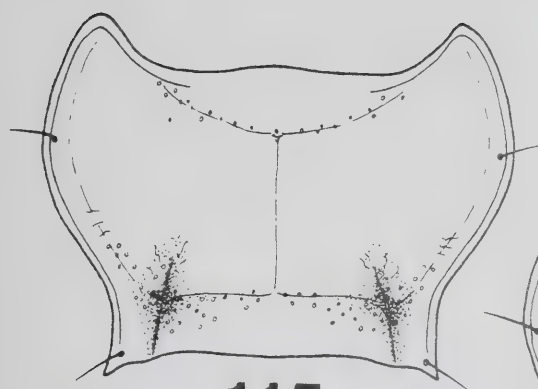
Figs. 101-107. Pronotum, dorsal aspect. 101. Nebria obliqua LeConte (Keystone, Wyoming). 102. Nebria appalachia Darlington (Soco Gap, North Carolina). 103. Nebria pallipes Say (Ste-Mélanie, Québec). 104. Nebria darlingtoni new species (Kyburz, California). 105. Nebria mannerheimii Fischer von Waldheim ([a] Cheekeye River, British Columbia; [b] Weiser, Idaho). 106. Nebria desolata Kavanaugh (11 miles southeast of Boulder, Utah). 107. Nebria gebleri gebleri Dejean (Cuprum, Idaho). Scale line = 1.0 mm.



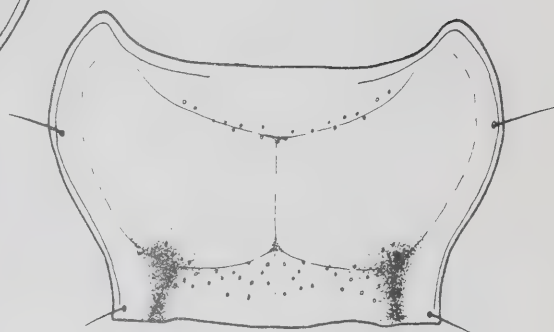
Figs. 108-114. Pronotum, dorsal aspect. 108. Nebria gebleri
cascadensis new subspecies (Glacier, Washington). 109. Nebria gebleri
rathvoni LeConte (Mount Lassen, California). 110. Nebria gebleri
siskiyouensis new subspecies (Trinity Alps, California). 110A. Nebria
gebleri strawberriensis new subspecies (Strawberry Mountains, Oregon).
111. Nebria carri new species (Dollarhide Summit, Idaho). 112. Nebria
kincaidi kincaidi Schwarz (Olympic Hot Springs, Washington). 113.
Nebria meanyi meanyi Van Dyke (Mount Rainier, Washington). 114.
Nebria meanyi lamarckensis new subspecies (Upper Lamarck Lake,
California). Scale line = 1.0 mm.



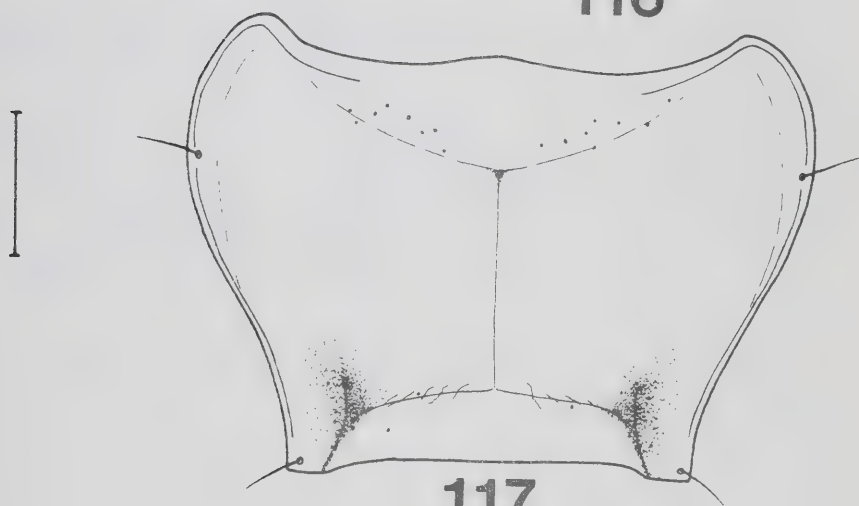
Figs. 115-118. Pronotum, dorsal aspect. 115. Nebria meanyi sylvatica
new subspecies (Olympic Hot Springs, Washington). 116. Nebria
metallica Fischer von Waldheim (Manning Provincial Park, British
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California). 118. Nebria piperi Van Dyke (Mount Rainier,
Washington). Scale line = 1.0 mm.



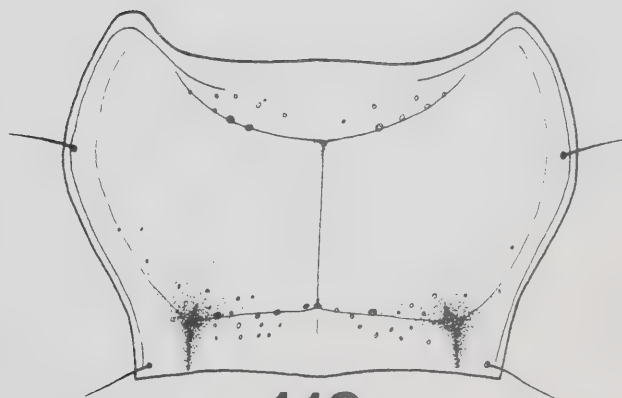
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Figs. 119-121A. Pronotum, dorsal aspect. 119. Nebria schwarzi
schwarzi Van Dyke (Kicking Horse River, British Columbia). 120.
Nebria schwarzi beverlianna new subspecies (Hoback River, Wyoming).
120A. Nebria purpurata LeConte (Hoosier Pass, Colorado). 121. Nebria
trifaria trifaria LeConte (Wasatch Mountains, Utah). 121A. Nebria
trifaria utahensis new subspecies (Henry Mountains, Utah). Scale line
= 1.0 mm.

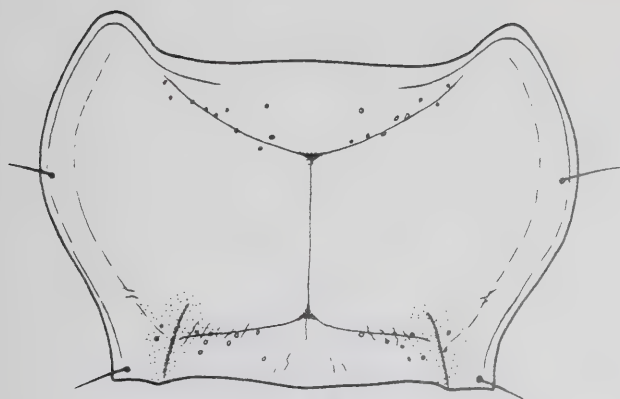
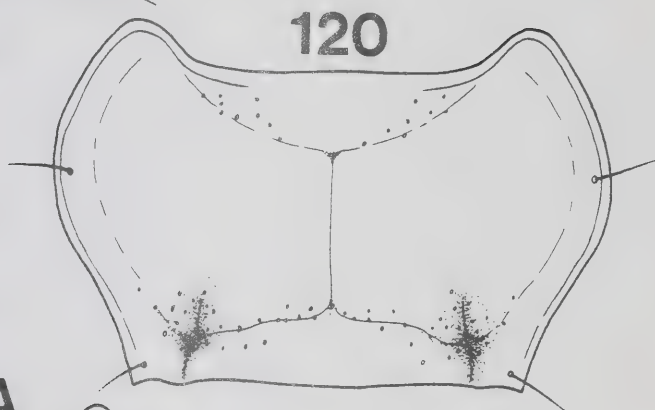
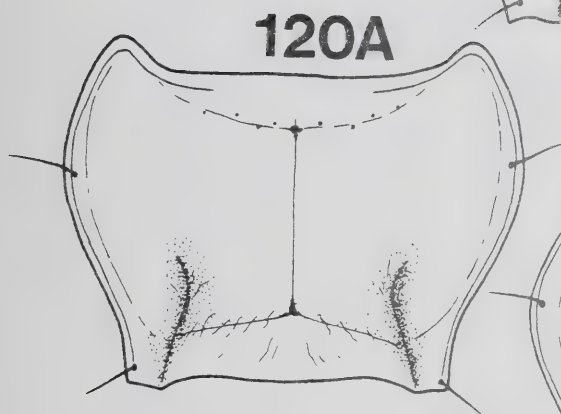
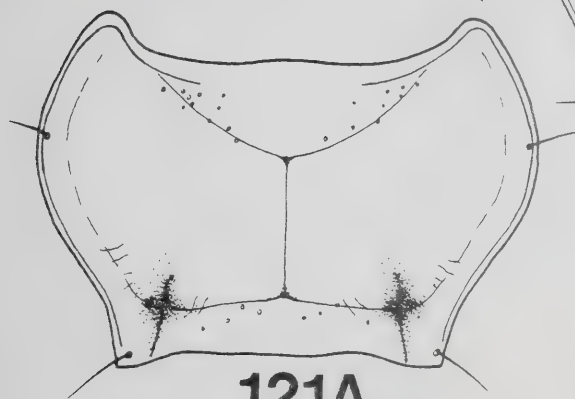
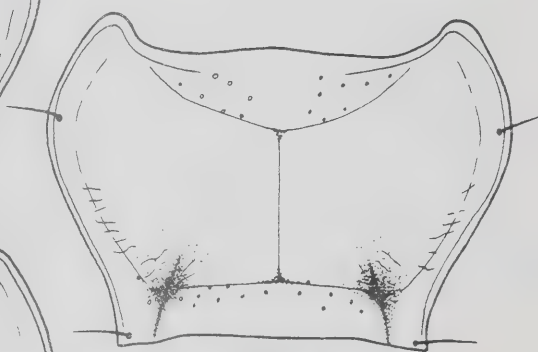
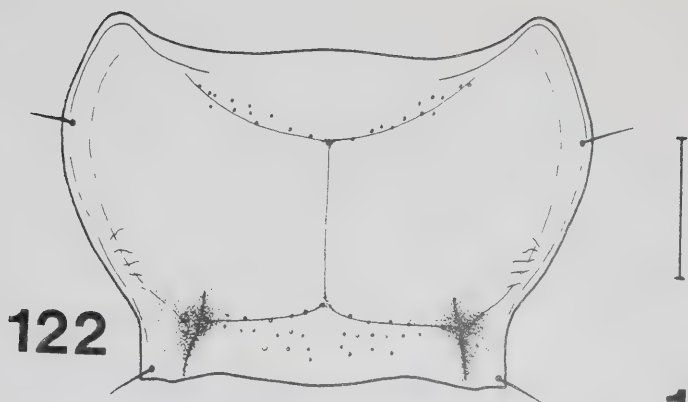
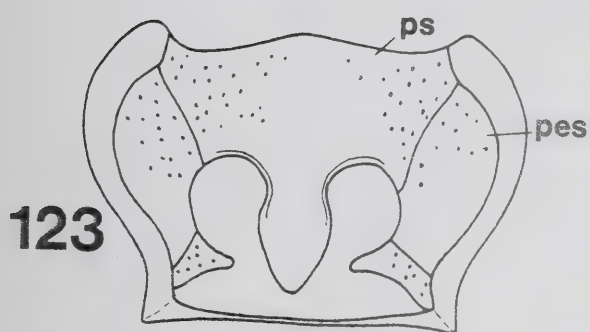
**119****120****120A****121A****121**

Fig. 122. Pronotum, dorsal aspect, Nebria coloradensis Van Dyke (Hoosier Pass, Colorado). Figs. 123-124. Prothoracic venter. 123. Nebria gouleti new species (Lewiston, Idaho). 124. Nebria sahlbergii modoc new subspecies (Warner Mountains, California). Figs. 125-132. Prosternal intercoxal process. 125. Nebria brevicollis (Fabricius) (Pitlochry, Scotland). 125A Nebria piperi Van Dyke (Mount Rainier, Washington). 126. Nebria fragilis fragilis Casey (North Fork Provo River, Utah). 127. Nebria appalachia Darlington (Soco Gap, North Carolina). 128. Nebria charlottae Lindroth (Massett, Queen Charlotte Islands). 129. Nebria gregaria Fischer von Waldheim (Unalaska Island, Aleutian Islands). 130. Nebria ingens riversi Van Dyke (Mount Lyell, California). 131. Nebria purpurata LeConte (Twin Lakes, Colorado). 132. Nebria arkansana uinta new subspecies (Logan River, Utah). All scale lines = 1.0 mm.

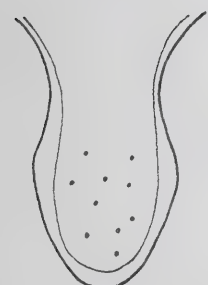
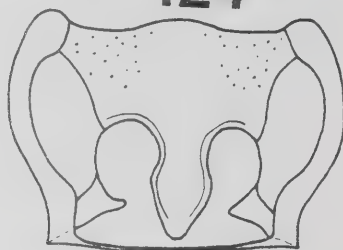


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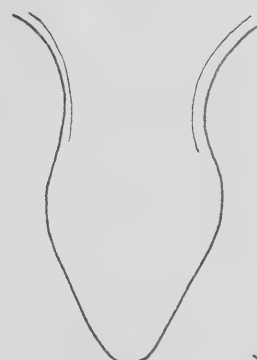
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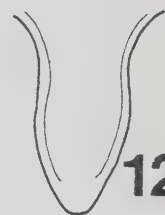
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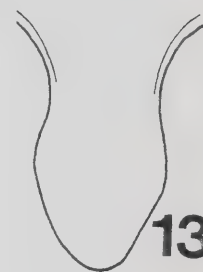
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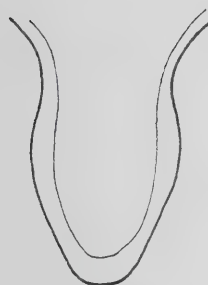
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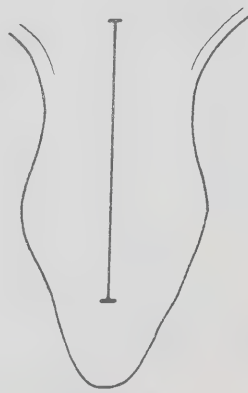
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132

Figs. 133-134. Front coxal cavities, Nebria brevicollis (Fabricius).

133. Ventral aspect. 134. Left lateral aspect. Figs. 135-142.

Elytral silhouette, dorsal aspect. 135. Generalized rectangular shape. 136. Generalized subrectangular shape. 137. Generalized subovoid shape. 138. Generalized subovoid-narrowed shape. 139.

Generalized ovoid shape. 140. Generalized tear-shape. 141. Nebria gregaria Fischer von Waldheim (Unalaska Island, Aleutian Islands).

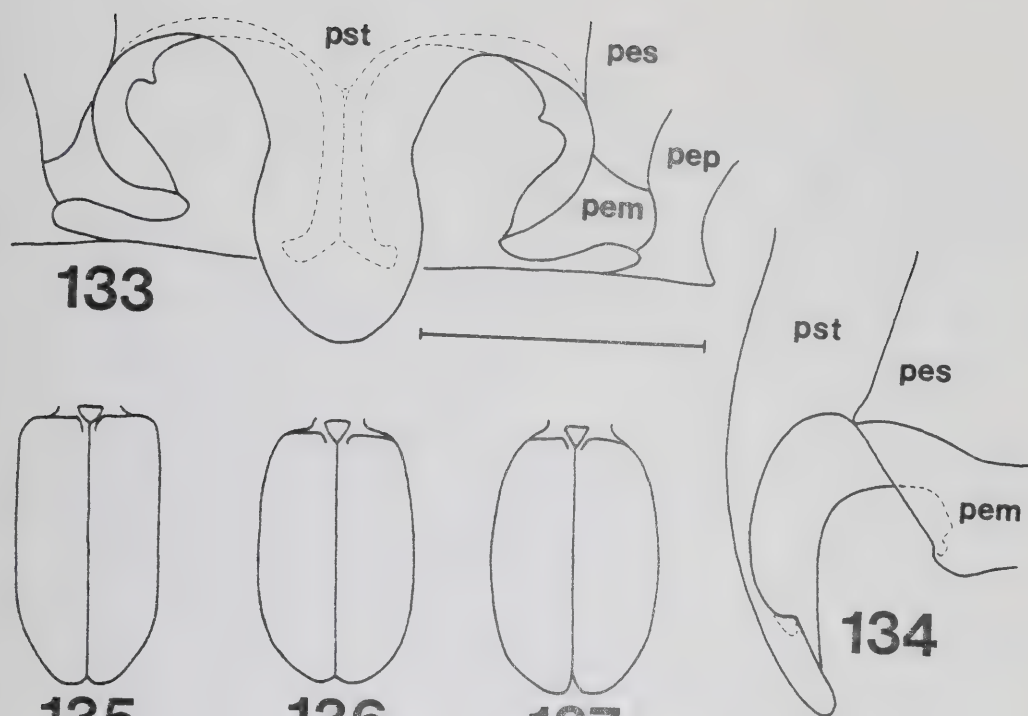
142. Nebria charlottae Lindroth (Masset. Queen Charlotte Islands).

Figs. 143-145. Elytral silhouette, [a] dorsal aspect, [b] posterior aspect. 143. Nebria desolata Kavanaugh (11 miles southeast of

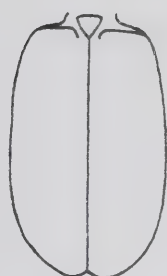
Boulder, Utah). 144. Nebria piperi Van Dyke (Mount Rainier,

Washington). 145. Nebria paradisi Darlington (Mount Rainier,

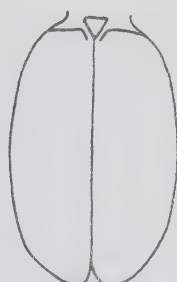
Washington). Scale line = 1.0 mm.



135



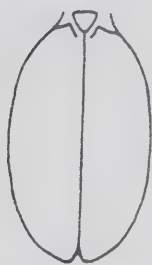
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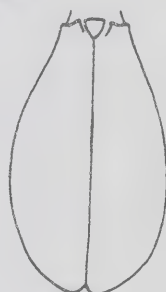
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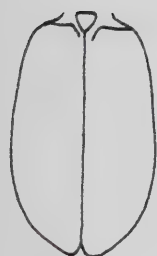
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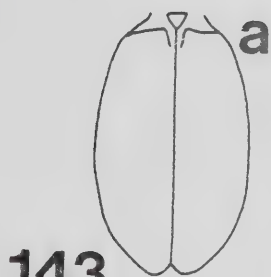
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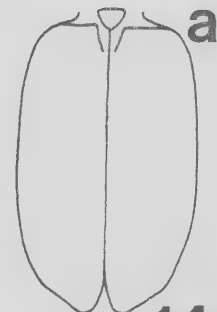


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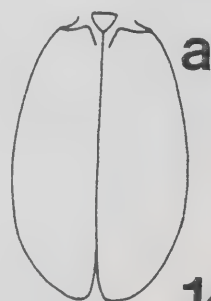
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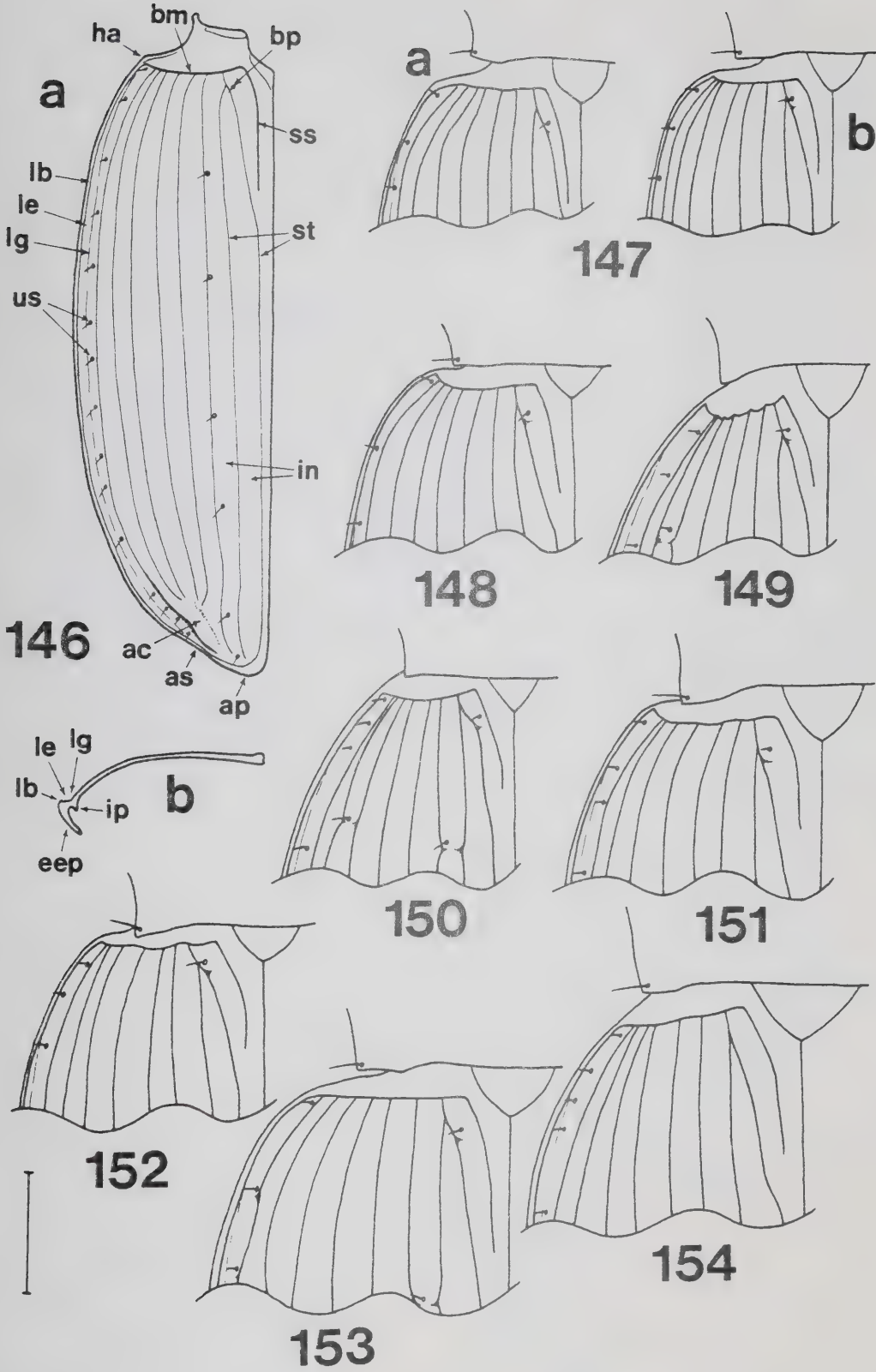
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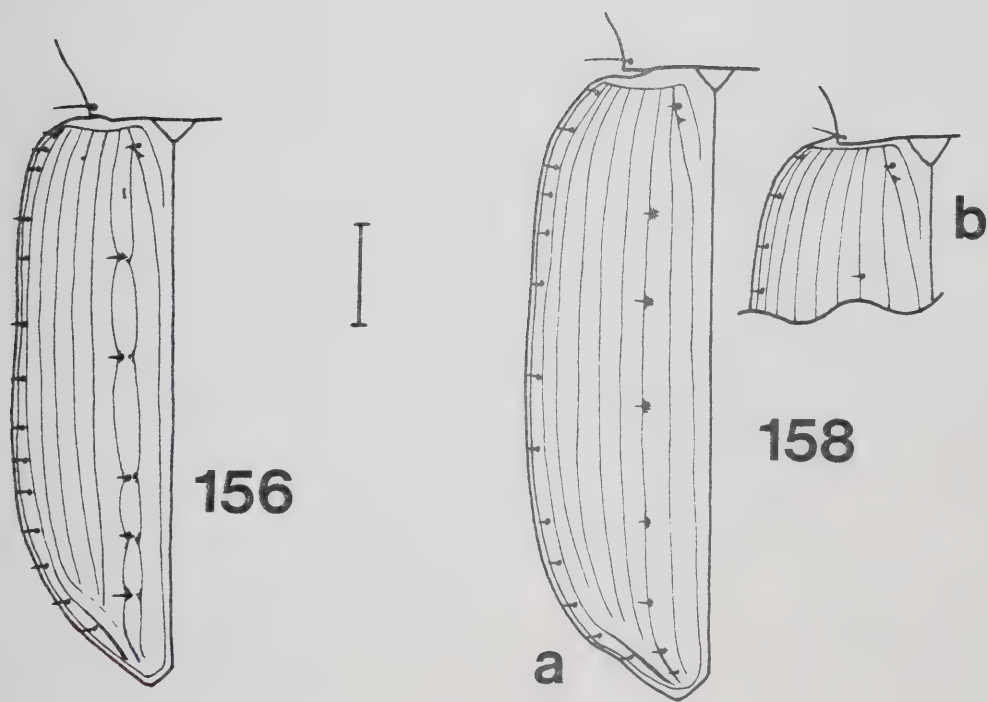
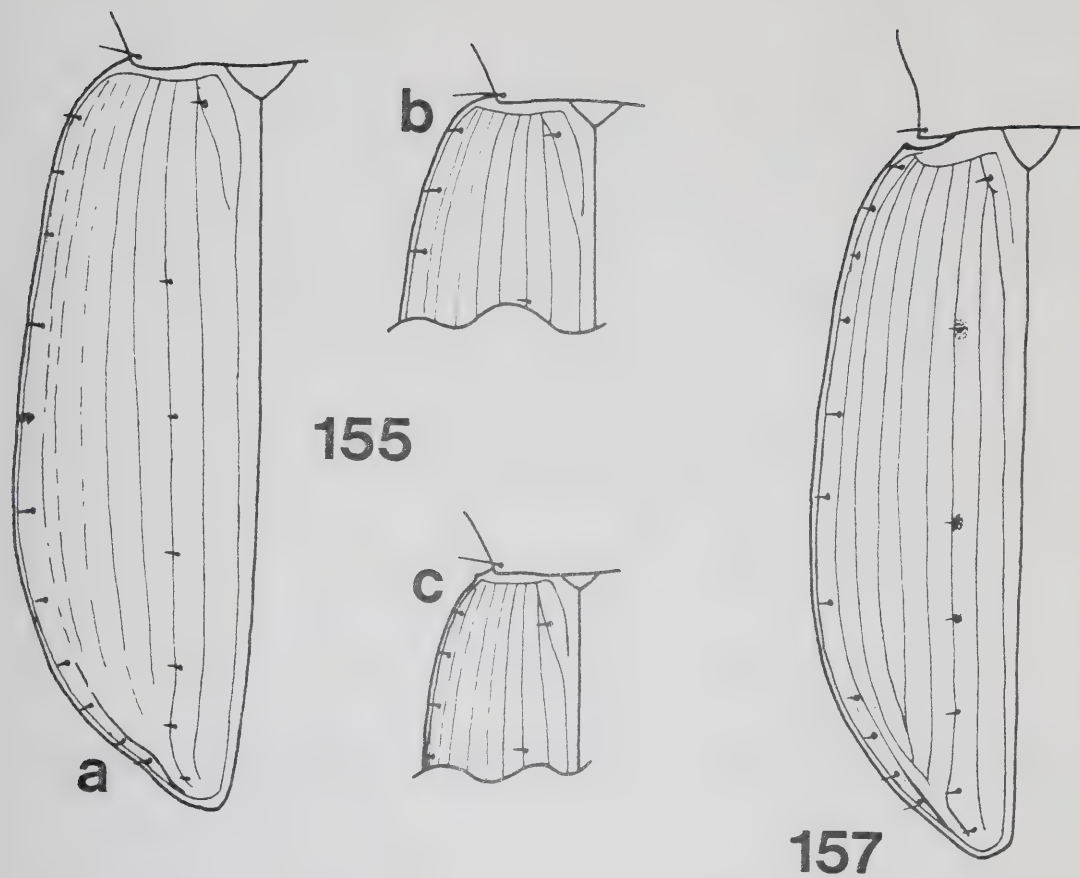
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b

Fig. 146. Left elytron, generalized form and associated terms ([a] dorsal aspect; [b] cross-section at middle); ac = apical carina; ap = apex; as = subapical sinuation of lateral margin; bm = basal margination; bp = basal pore; eep = elytral epipleuron; ha = humeral angle; in = intervals; ip = internal plica; lb = lateral bead; le = lateral explanation; lg = lateral groove; ss = scutellar striole; st = stria; us = umbilicate series of setae. Figs. 147-154. Basal region of left elytron. 147. Nebria arkansana edwardsi new subspecies ([a] Rancheria, Yukon Territory; [b] Gorge Creek, Alberta). 148. Nebria altaica Gebler (Slyudanka, Irkutskaya Oblast, U.S.S.R.). 149. Nebria kincaidi kincaidi Schwarz (Prince Rupert, British Columbia). 150. Nebria kincaidi balli new subspecies (Mount Rainier, Washington). 151. Nebria meanyi meanyi Van Dyke (Mount Shasta, California). 152. Nebria meanyi lamarckensis new subspecies (Upper Lamarck Lake, California). 153. Nebria piperi Van Dyke (Mount Rainier, Washington). 154. Nebria ingens ingens Horn (Mount Whitney, California). Scale line = 1.0.

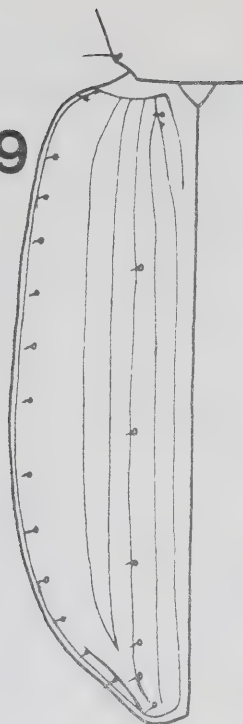


Figs. 155-158. Left elytron, dorsal aspect. 155. Nebria virescens
Horn ([a] Vancouver Island, British Columbia; [b] Kamiak Butte,
Washington; [c] Bunker Hill Lookout, Washington). 156. Nebria frigida
Sahlberg (Kolyma River, Siberia, U.S.S.R.). 157. Nebria acuta acuta
Lindroth (Mount Rainier, Washington). 158. Nebria sahlbergii
sahlbergii Fischer von Waldheim ([a] Mount Rainier, Washington; [b]
Hope Trail, British Columbia). Scale line = 1.0 mm.

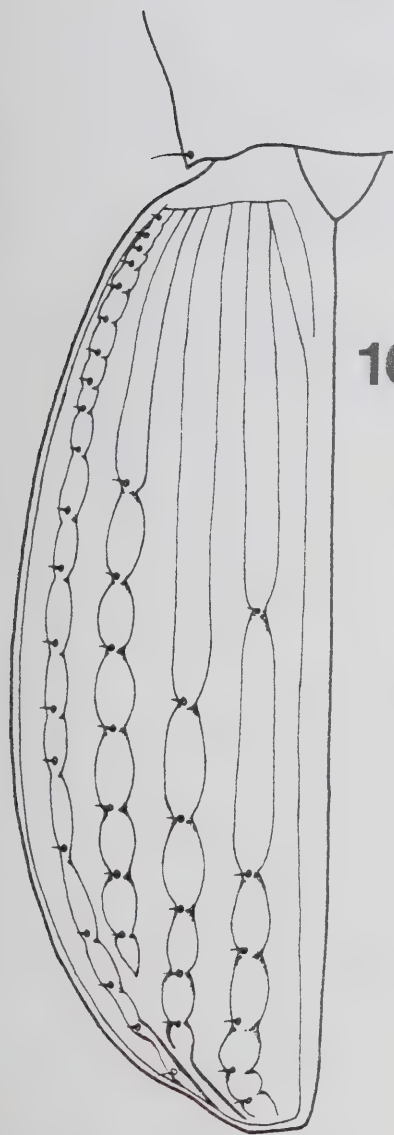


Figs. 159-161. Left elytron, dorsal aspect. 159. Nebria suturalis
LeConte (Mount Mansfield, Vermont). 160. Nebria vandykei vandykei
Bänninger (Mount Rainier, Washington). 161. Nebria schwarzi schwarzi
Van Dyke (Wildhay River, Alberta). Scale line = 1.0 mm.

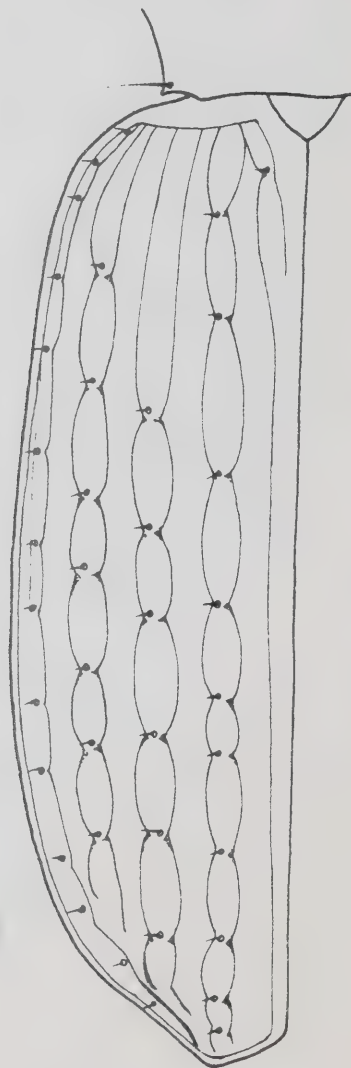
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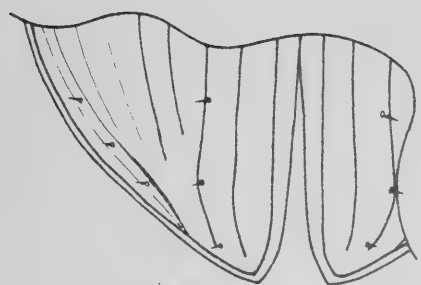
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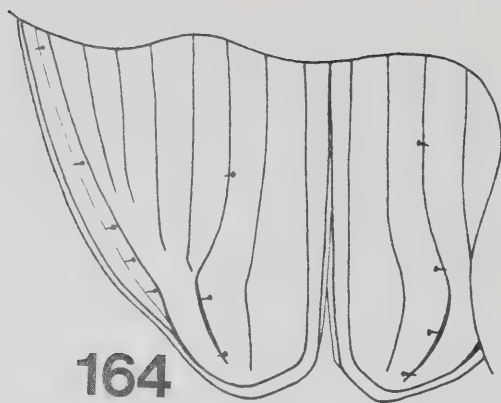
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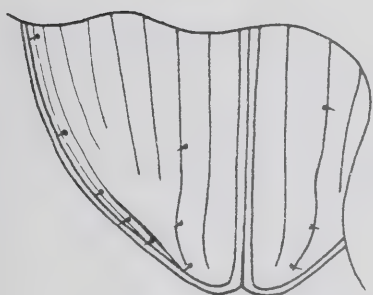
Figs. 162-168. Elytra, apical region, dorsal aspect. 162. Nebria virescens Horn (Kamiak Butte, Washington). 163. Nebria chalceola Bates (Mount Hiei, Kyoto, Japan). 164. Nebria paradisi Darlington (Mount St. Helens, Washington). 165. Nebria lacustris lacustris Casey (Mount Washington, New Hampshire). 166. Nebria pallipes Say (Gatlinburg, Tennessee). 167. Nebria meanyi meanyi Van Dyke (Mount Hood, Oregon). 168. Nebria schwarzi schwarzi Van Dyke (Kicking Horse River, British Columbia). Scale line = 1.0 mm.



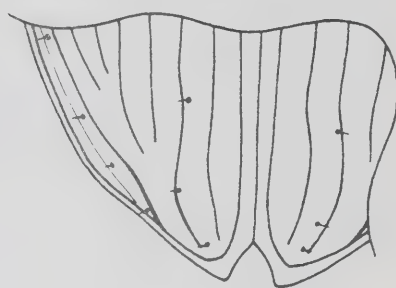
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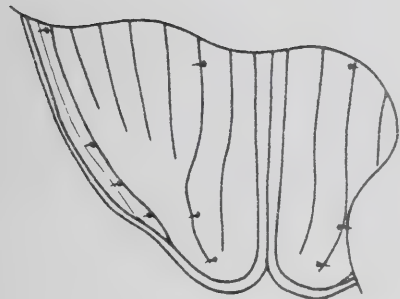
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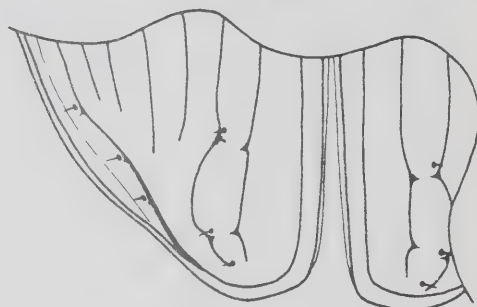
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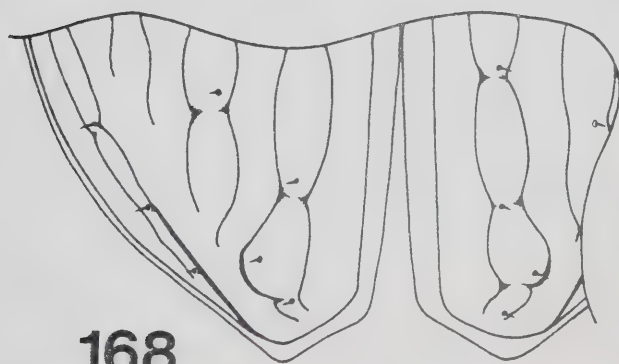
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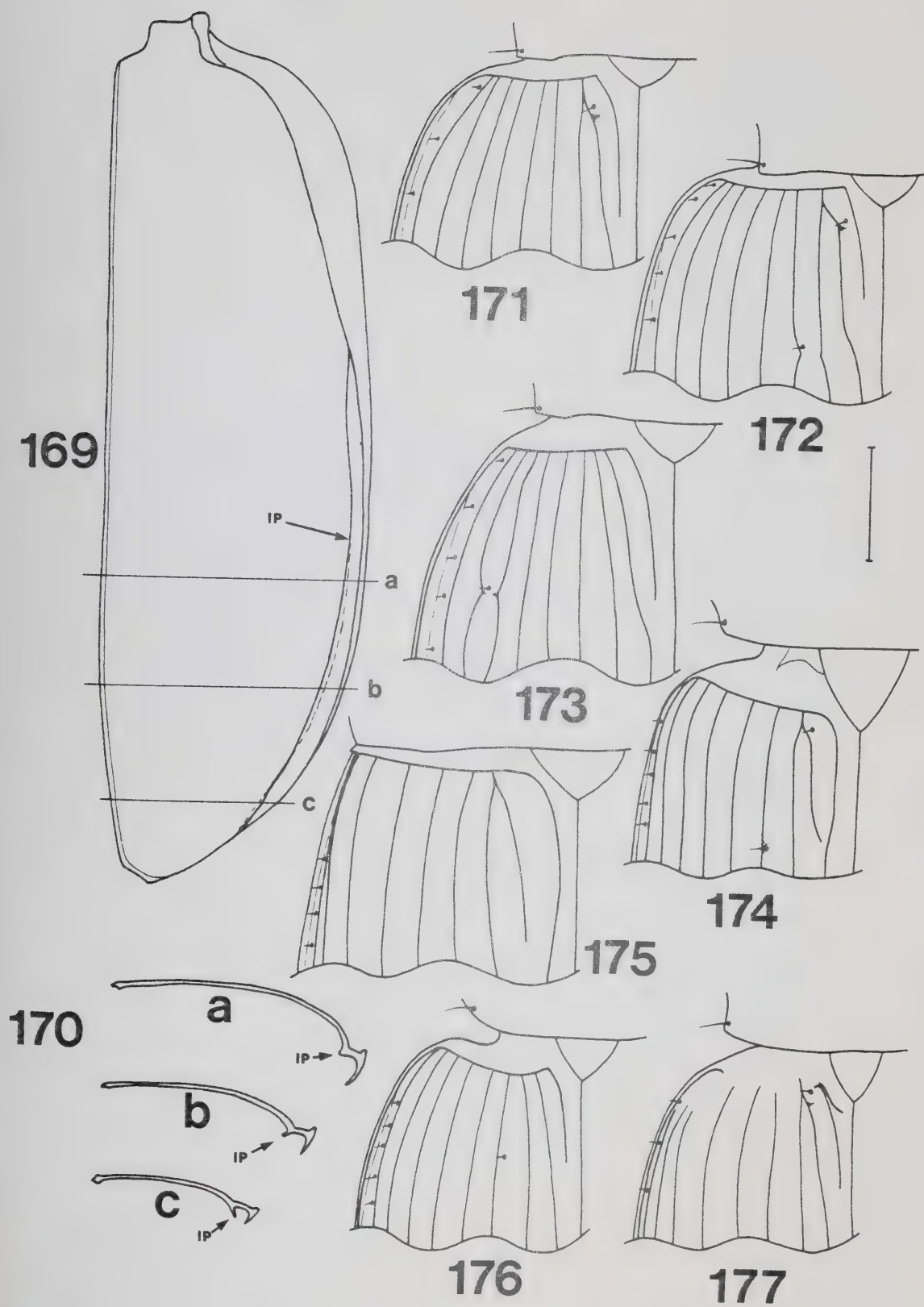


168





Fig. 169. Left elytron Nebria hudsonica LeConte, ventral aspect; ip = internal plica; a, b, and c refer to respective cross-sections in Fig. 170. Fig. 170. Left elytron Nebria hudsonica LeConte, cross-sections [a], [b], and [c] as in Fig. 169; ip = internal plica. Figs. 171-177. Left elytron, basal region. 171. Nebria gouleti new species (Clearwater River, Idaho). 172. Nebria metallica Fischer von Waldheim (Broad Bay, Unalaska Island, Aleutian Islands). 173. Nebria trifaria trifaria LeConte (Cedar Canyon, Utah). 174. Pterostichus adstrictus Eschscholtz (Edmonton, Alberta). 175. Amara insignis Dejean (Antelope, California). 176. Agonum maculicolle Dejean (Tehama County, California). 177. Patrobus longicornis Say (Edmonton, Alberta). Scale line = 1.0 mm.



Figs. 178-179. Fossil elytral fragments. 178. Nebria nivalis Paykull ([a] and [b] basal portions of right elytra; Scarborough Bluffs, Toronto, Ontario; ca. 70,000 years B.P. [A. Morgan, personal communication]). 179. Nebria pallipes Say and/or Nebria lacustris Casey ([a], [b], and [d] basal portions of left elytra, [c] same of right elytron; Don Valley Brickpit, Toronto, Ontario; ca. 100,000 years B.P. [personal communication, A. Morgan]). Scale line = 1.0 mm.

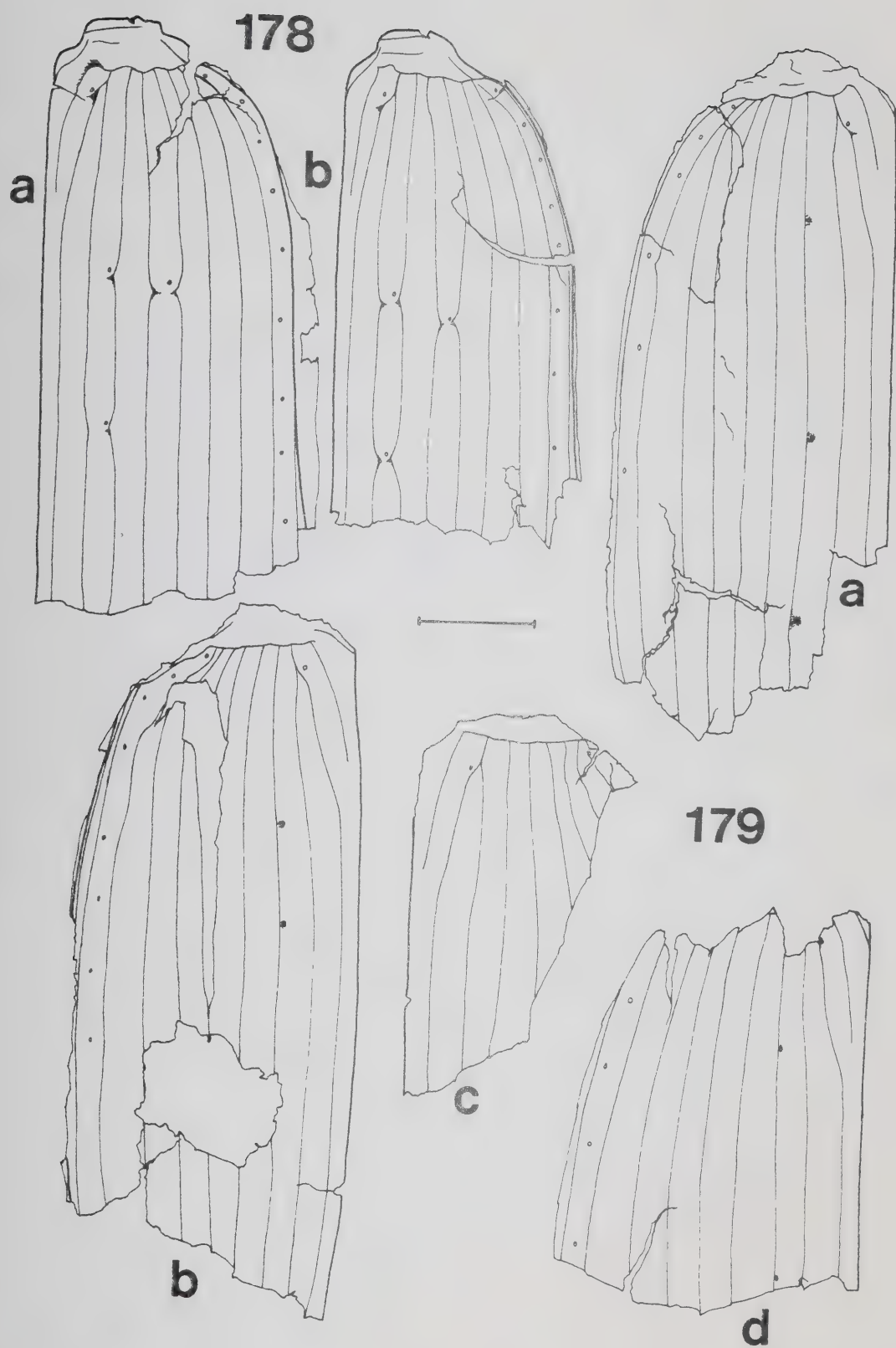


Fig. 180. Fossil elytral fragments, Nebria suturalis LeConte ([a] basal portion right elytron, [b] nearly entire left elytron, and [c] basal portion left elytron; Scarborough Bluffs, Toronto, Ontario; ca. 70,000 years B.P. [personal communication, A. Morgan]). Scale line = 1.0 mm.

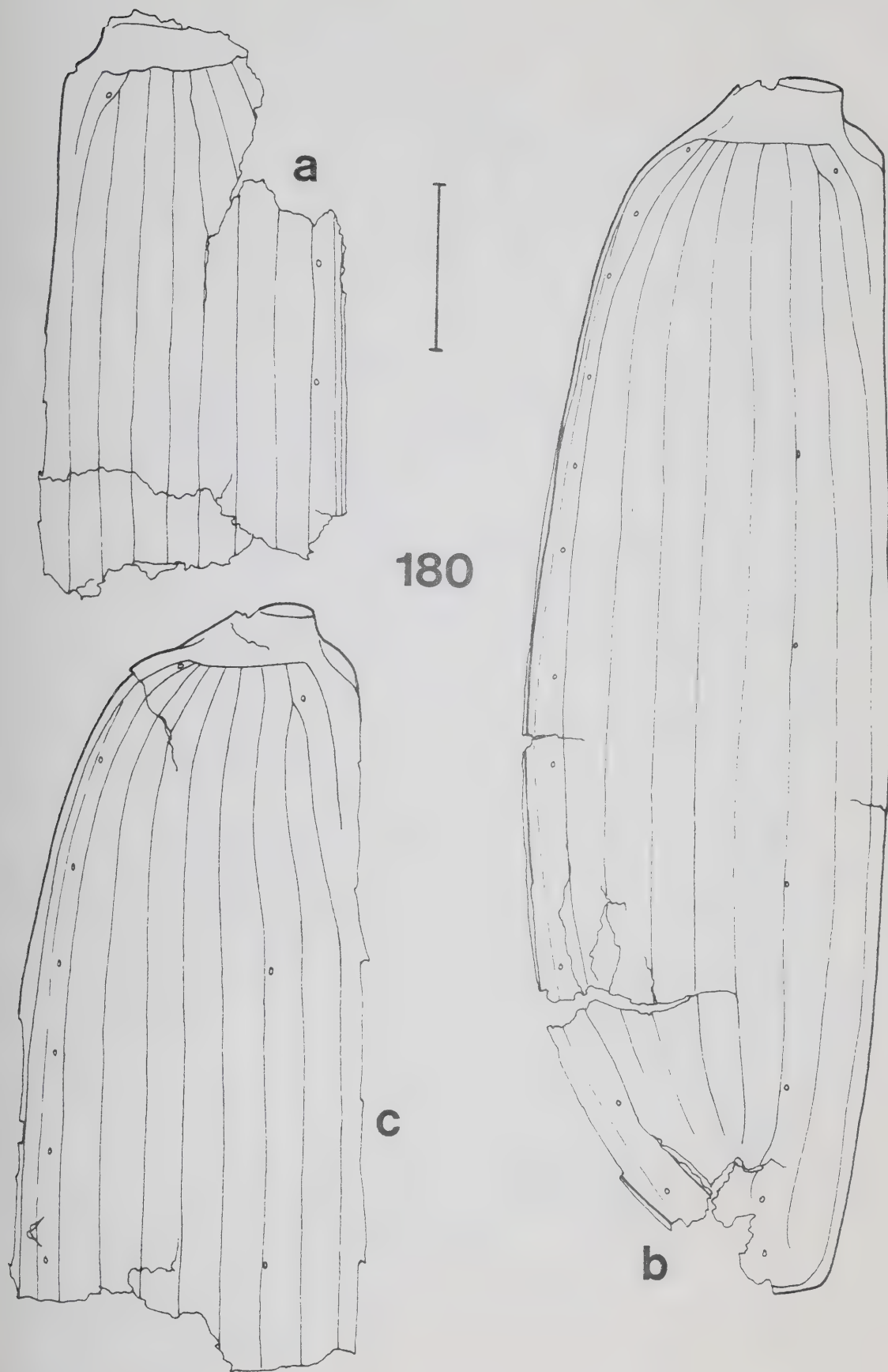
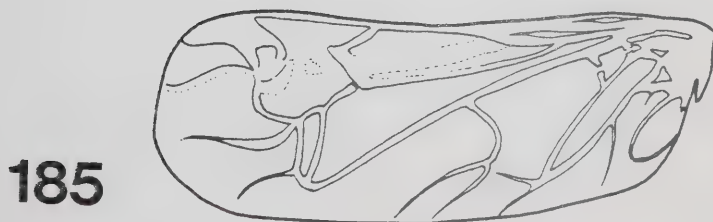
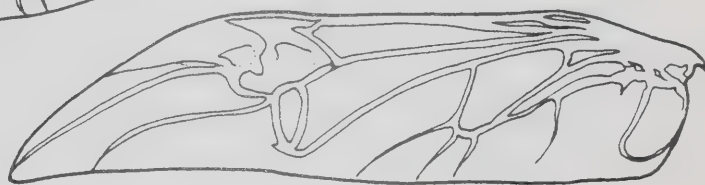
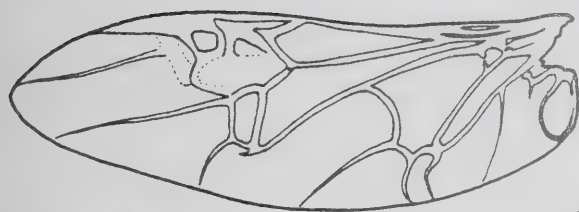
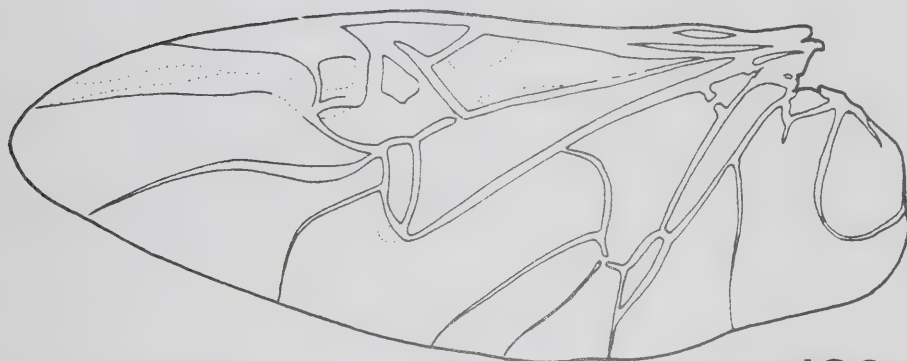
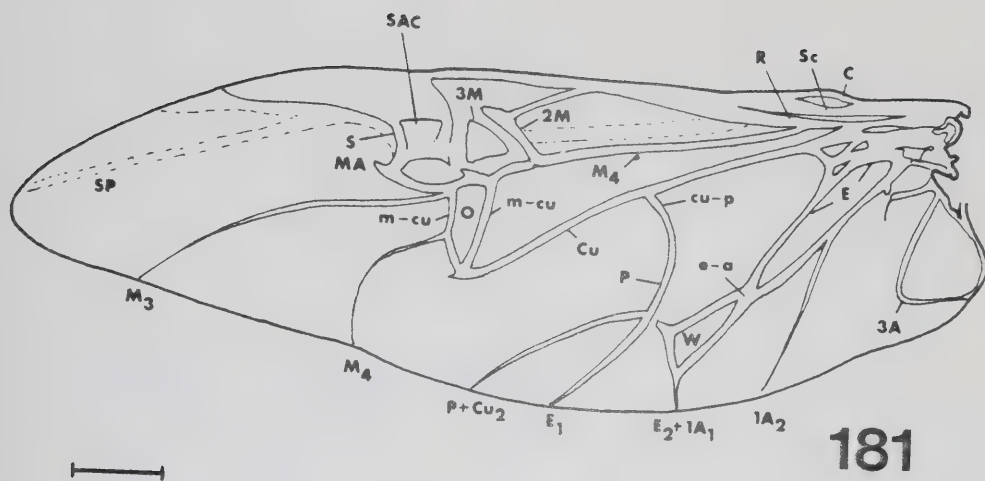
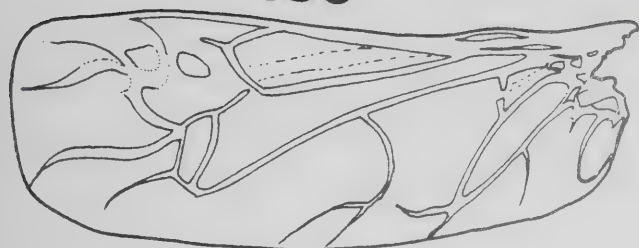


Fig. 181. Left hindwing, Nebria brevicollis (Fabricius) (Aydon Castle, Northumberland, England); A = Anal Vein; C = Costal Vein; Cu = Cubital Vein; cu-p = cubito-plical cross-vein; E = Empusal Vein; e-a = empusal-anal cross-vein; M = Median Vein; MA = Anterior Median Vein; m-cu = median-cubital cross-vein; O = Oblongum Cell; P = Plical Vein; R = Radial Vein; S = sector cross-vein; SAC = Anterior Sector Cell; Sc = Subcostal Vein; SP = Posterior Sector Vein; W = Wedge Cell. Figs. 182-185. Left hindwing, dorsal aspect. 182. Nebria virescens Horn (Vancouver Island, British Columbia). 183. Nebria appalachia Darlington (Soco Gap, North Carolina). 184. Nebria coloradensis Van Dyke (Mexican Cut Lake, Colorado). 185. Nebria charlottae Lindroth (Masset, Queen Charlotte Islands). Scale line = 1.0 mm.

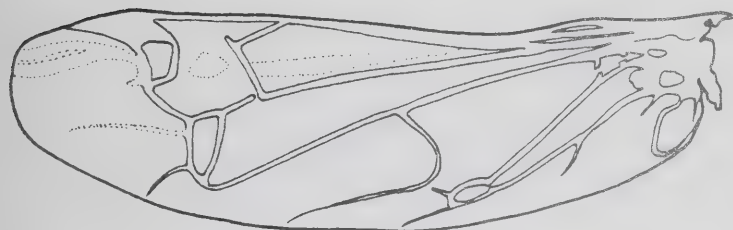


Figs. 186-192. Left hindwing, dorsal aspect. 186. Nebria gregaria Fischer von Waldheim (Dutch Harbor, Unalaska Island, Aleutian Islands). 187. Nebria purpurata LeConte (Quandary Peak, Colorado). 188. Nebria fragilis fragilis Casey (North Fork Provo Canyon, Utah). 189. Nebria lyelli Van Dyke (Mount Lyell, California). 190. Nebria spatulata sierrae new subspecies (Mono County, California). 191. Nebria gyllenhali castanipes (Kirby) (Edmonton, Alberta). 192. Nebria gyllenhali lindrothi new subspecies (Grand Mesa, Colorado). Scale line = 1.0 mm.

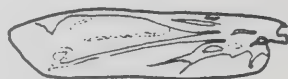
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188



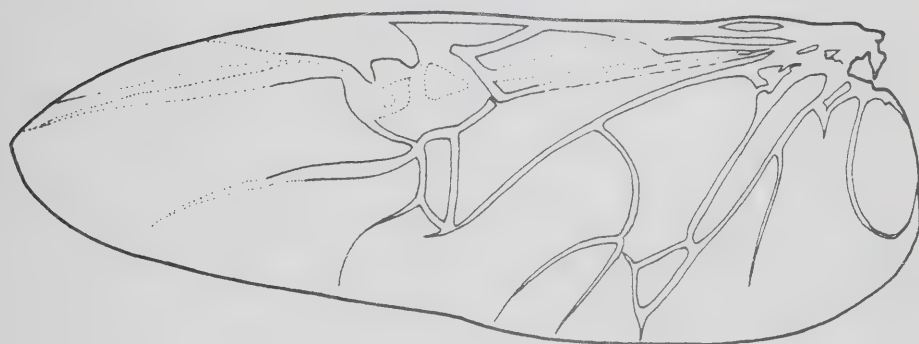
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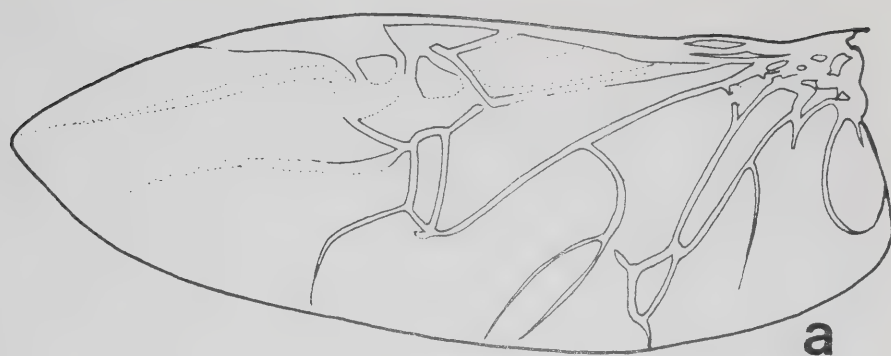
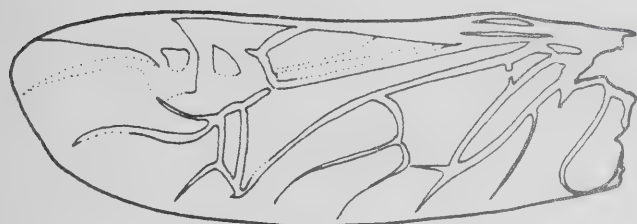
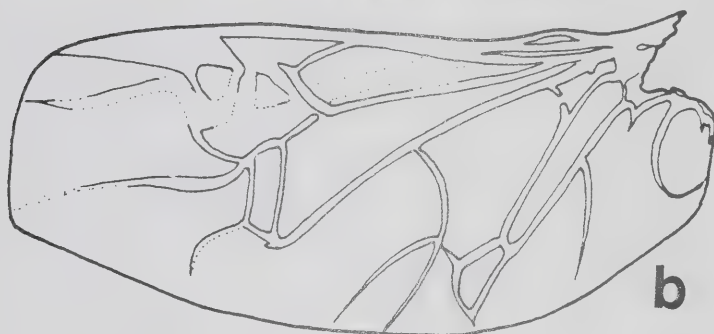
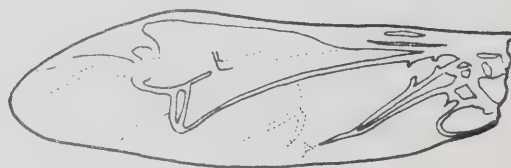


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Figs. 193-196. Left hindwing, dorsal aspect. 193. Nebria arkansana
arkansana Casey ([a] Blue Lake, Huerfano County, Colorado; [b] White
River Mountains, Colorado). 194. Nebria arkansana uinta new
subspecies (Logan River, Utah). 195. Nebria navajo new species (19
miles southwest of Kayenta, Arizona). 196. Nebria trifaria utahensis
new subspecies (Henry Mountains, Utah). Scale line = 1.0 mm.

**193****194****195****196**

Figs. 197-200. Oblongum cell, left hindwing, dorsal aspect. 197. Nebria frigida Sahlberg (Eagle Summit, Alaska); Cu = Cubital Vein; M = Median Vein; m-cu = median-cubital cross-vein; O = Oblongum Cell.

198. Nebria trifaria catenata Casey (Wolf Creek Pass, Colorado).

199. Nebria hudsonica LeConte (Pinecliffe, Colorado). 200. Nebria obliqua LeConte (Golden, Colorado). Figs. 201-205. Wedge cell, left hindwing, dorsal aspect. 201. Nebria pallipes Say (Pauling, New York); A = Anal Vein; E = Empusal Vein; e-a = empusal-anal cross-vein; W = Wedge Cell. 202. Nebria darlingtoni new species (Riverton, California). 203. Nebria sahlbergii modoc new subspecies (Warner Mountains, California). 204. Nebria piperi Van Dyke (Mount Rainier, Washington). 205. Nebria schwarzi schwarzi Van Dyke (Kicking Horse River, British Columbia). Scale line = 1.0 mm.

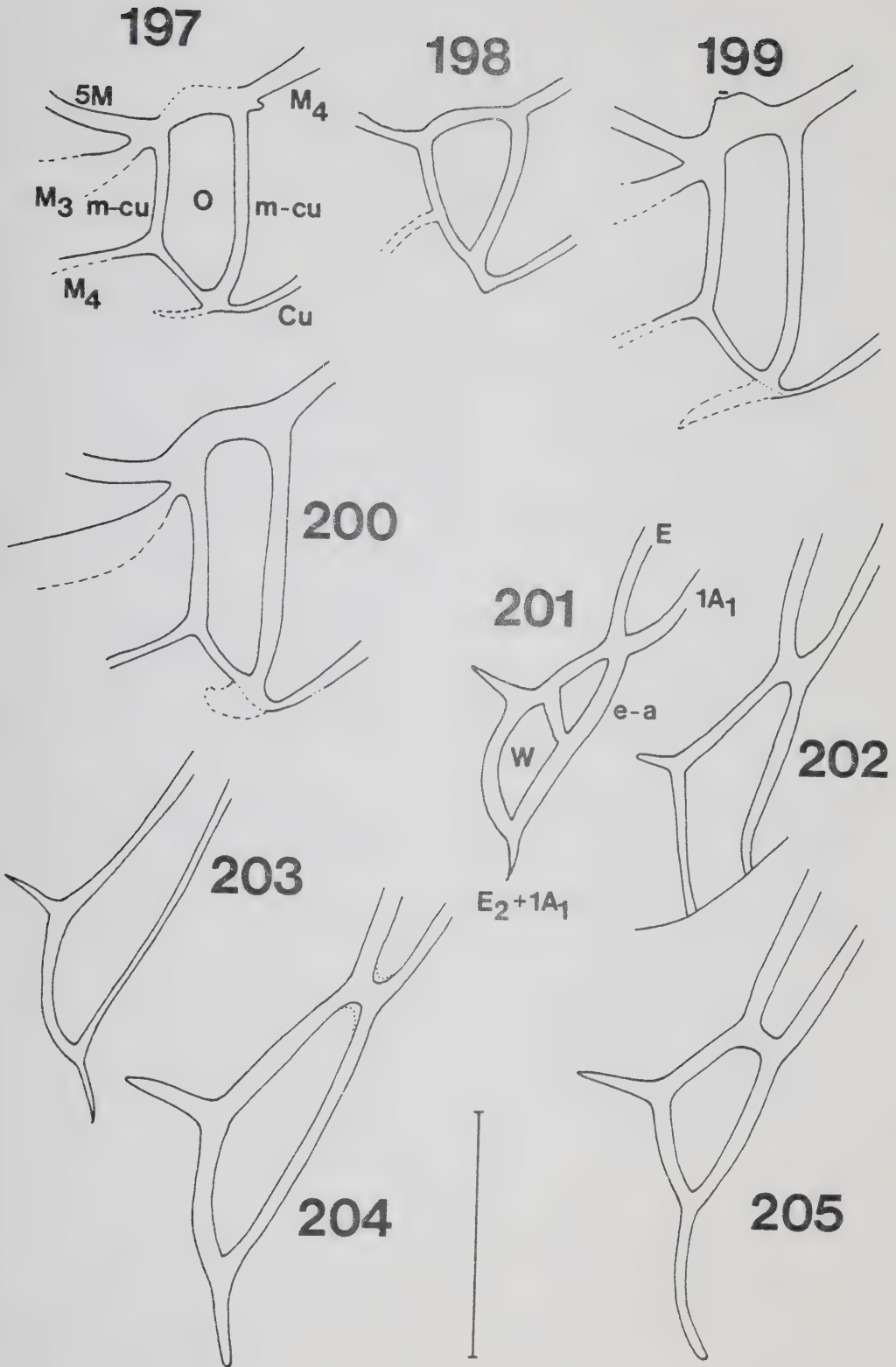
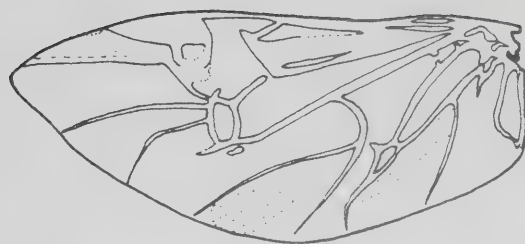
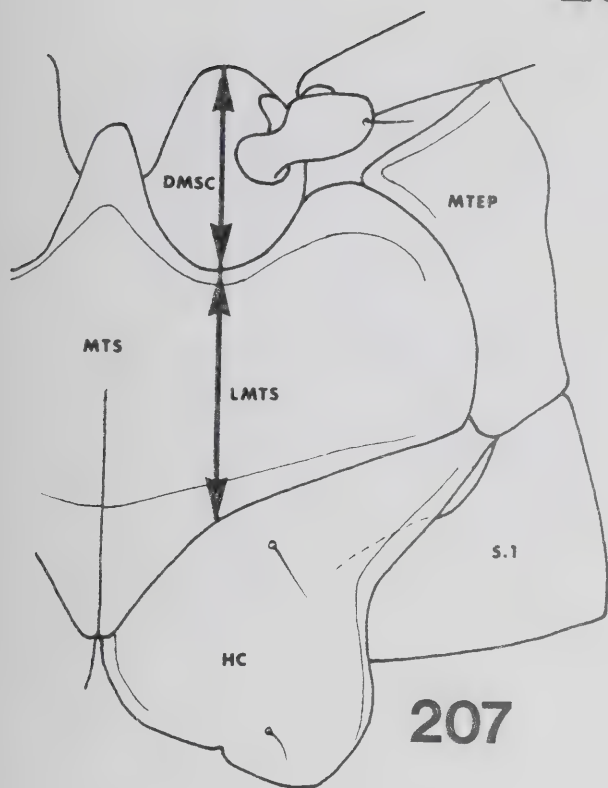


Fig. 206. Left hindwing, dorsal aspect, Trachypachus gibbsi LeConte (Yosemite National Park, California). Fig. 207. Metathoracic venter illustrating measure of relative metasternum length; DMSC = diameter of mesocoxa; HC = hind coxa; LMTS = length of metasternum; MTEP = metepisternum; MTS = metasternum; S.1 = first visible abdominal sternum. Figs. 208-210. Metasternum. 208. Nebria piperi Van Dyke (Cheekeye River, British Columbia). 209. Nebria fragilis teewinot new subspecies (Togwotee Pass, Wyoming). 210. Nebria kincaidi balli new subspecies (Mount Rainier, Washington). Scale line = 1.0 mm.



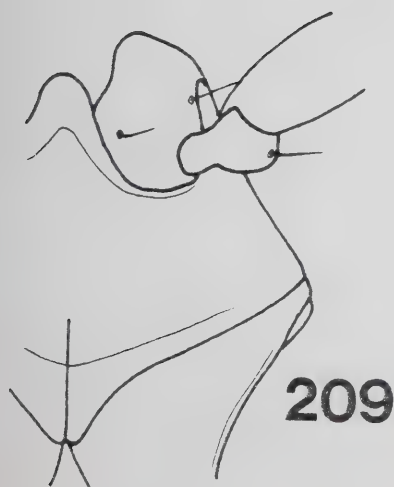
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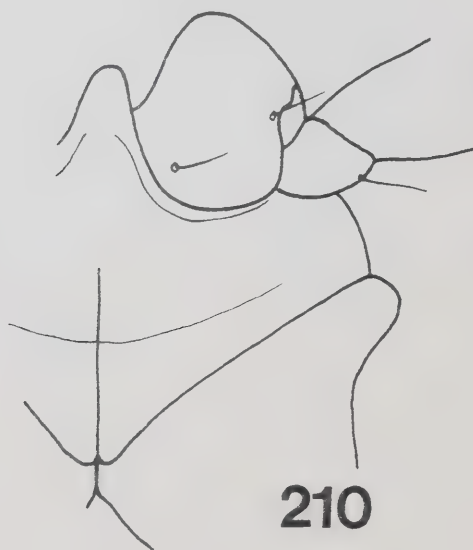
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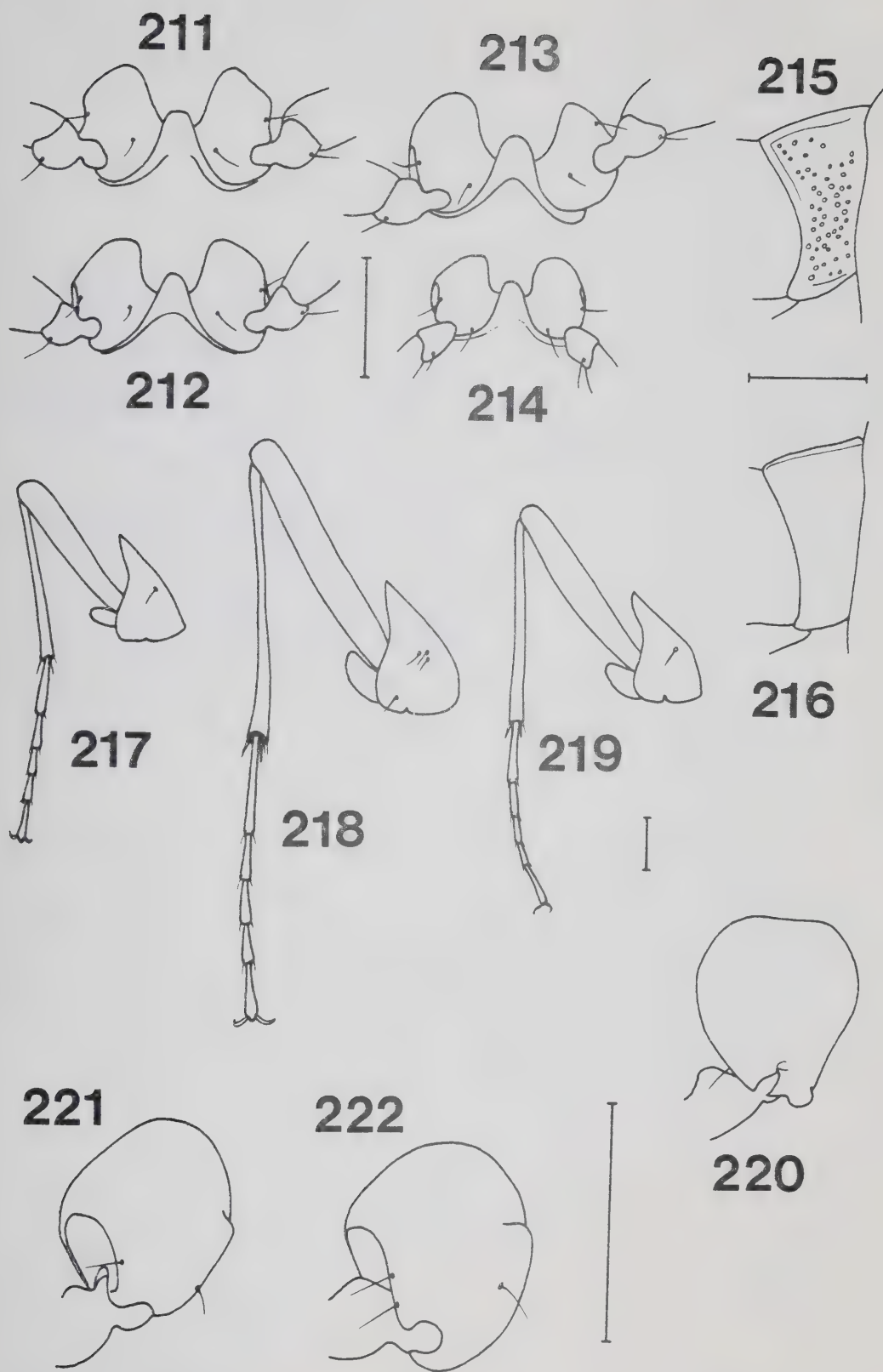


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Figs. 211-214. Anterior intercoxal process of metasternum. 211. Nebria meanyi lamarckensis new subspecies (Upper Lamarck Lake, California). 212. Nebria zioni oasis new subspecies (Pine Valley Mountains, Utah). 213. Nebria brevicollis (Fabricius) (Chillingham, England). 214. Nebria virescens Horn (Alta Meadow, California). Figs. 215-216. Metepisternum. 215. Nebria brevicollis (Fabricius) (Chillingham, England). 216. Nebria obliqua LeConte (Wellville, Colorado). Figs. 217-219. Right hindleg, ventral aspect. 217. Nebria crassicornis crassicornis Van Dyke (Mount Rainier, Washington). 218. Nebria vandykei wyeast new subspecies (Mount Hood, Oregon). 219. Nebria gouleti new species (Clearwater River, Idaho). Fig. 220. Right front coxa, ventral aspect, Nebria obliqua LeConte (Panchuela Creek, New Mexico). Figs. 221-222. Right middle coxa, ventral aspect. 221. Nebria obliqua LeConte (Panchuela Creek, New Mexico). 222. Nebria metallica Fischer von Waldheim (Mount Rainier, Washington). All scale lines = 1.0 mm.

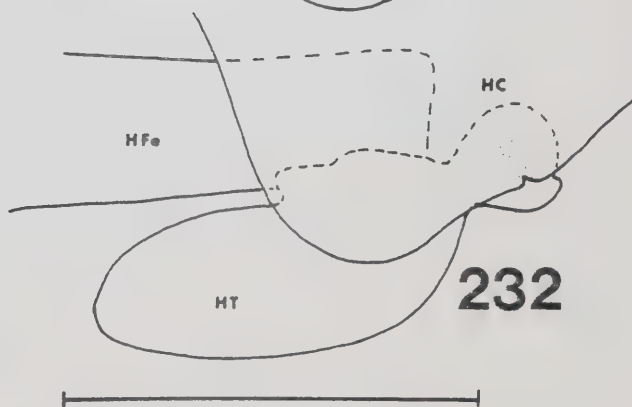
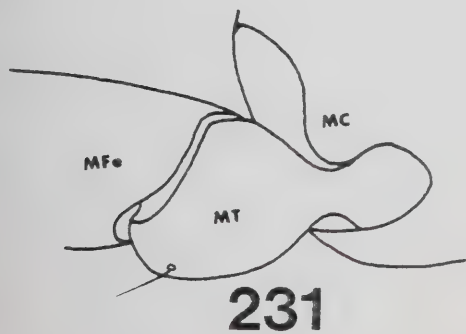
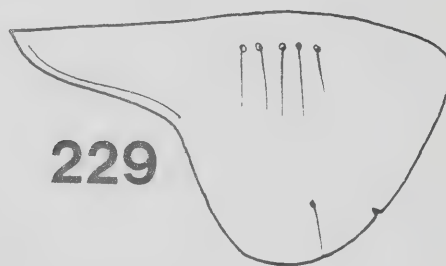
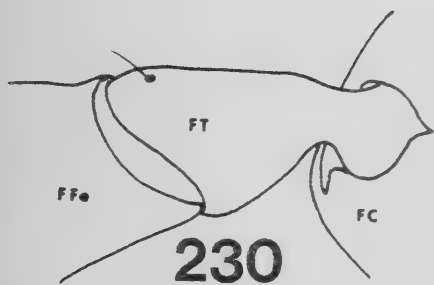
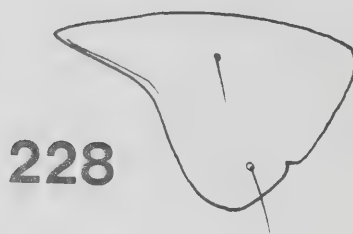
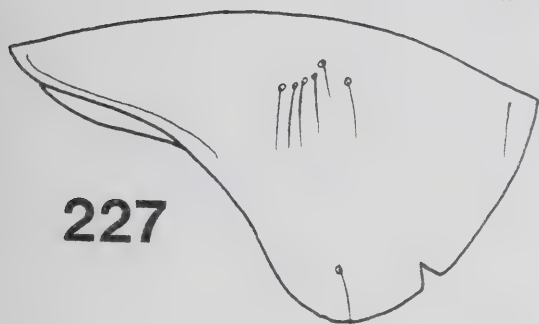
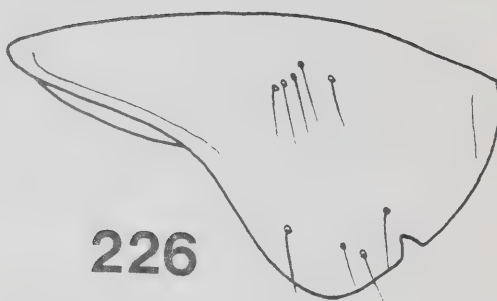
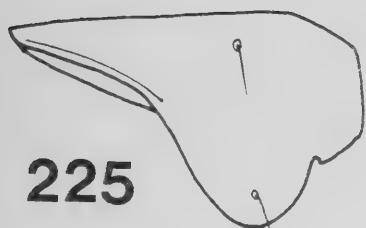
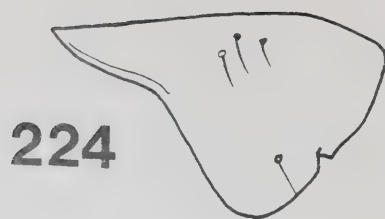
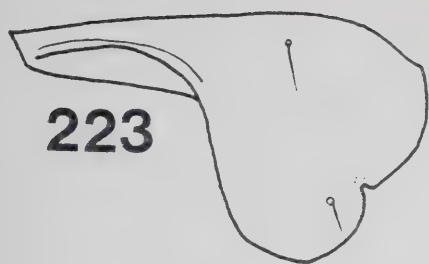




The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be carefully documented to ensure the integrity of the financial data. The text then moves on to describe the various methods used to collect and analyze this data, highlighting the role of technology in streamlining the process. It also touches upon the challenges faced by organizations in this regard, such as data security and the need for standardized reporting formats. The final section of the document provides a summary of the key findings and offers recommendations for future research and implementation.



Figs. 223-229. Right hind coxa, ventral aspect. 223. Pelophila borealis (Paykull) (Calling Lake, Alberta). 224. Nebria fragilis fragilis Casey (American Fork Canyon, Utah). 225. Nebria virescens Horn (Corvallis, Oregon). 226. Nebria schwarzi schwarzi Van Dyke (Yoho River, British Columbia). 227. Nebria schwarzi beverlianna (Hoback River, Wyoming). 228. Nebria appalachia Darlington (Mount Mitchell, North Carolina). 229. Nebria desolata Kavanaugh (Escalante River, Utah). Fig. 230. Right front trochanter, ventral aspect, Nebria diversa LeConte (Tofino, British Columbia); FC = front coxa; FFe = front femur; FT = front trochanter. Fig. 231. Right middle trochanter, ventral aspect, Nebria diversa LeConte (Tofino, British Columbia); MC = middle coxa; MFe = middle femur; MT = middle trochanter. Fig. 232. Right hind trochanter, ventral aspect, Nebria diversa LeConte (Tofino, British Columbia); HC = hind coxa; HFe = hind femur; HT = hind trochanter. All scale lines = 1.0 mm.



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Fig. 233. Right front femur, Nebria brevicollis (Fabricius)
(Newbiggen, England), ([a] anterior aspect, [b] posterior aspect).

Fig. 234. Right middle femur, Nebria brevicollis (Fabricius)
(Newbiggen, England), ([a] anterior aspect, [b] posterior aspect).

Fig. 235. Right hind femur, Nebria brevicollis (Fabricius) (Newbiggen,
England), ([a] dorsal aspect, [b] ventral aspect). Scale line = 1.0
mm.

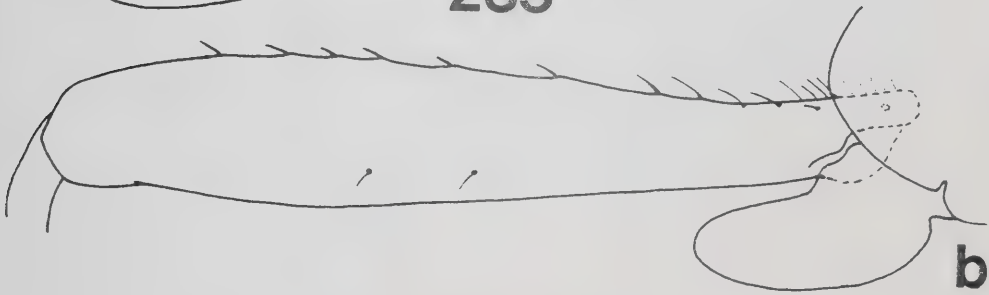
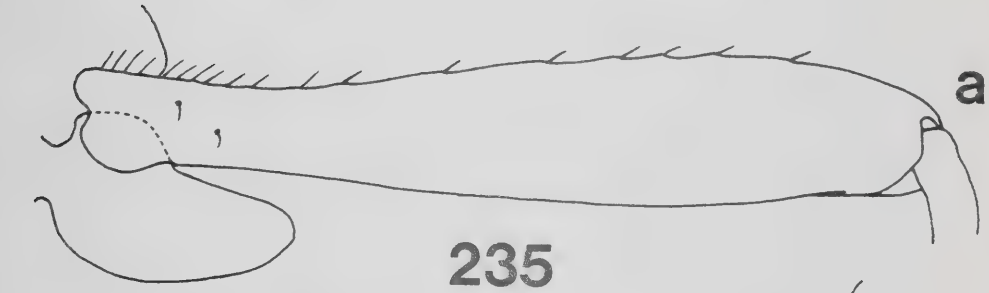
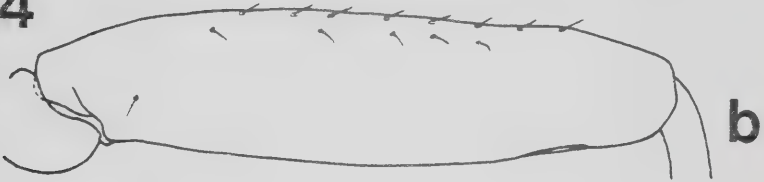
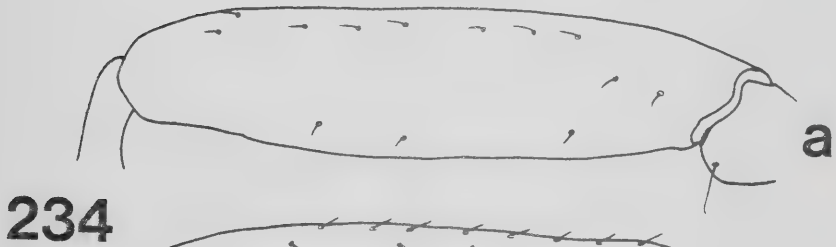
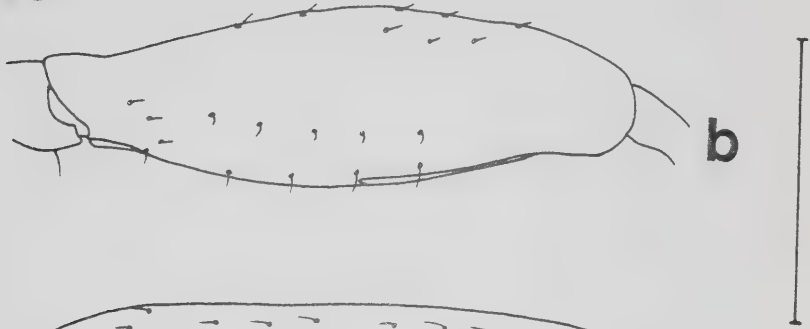
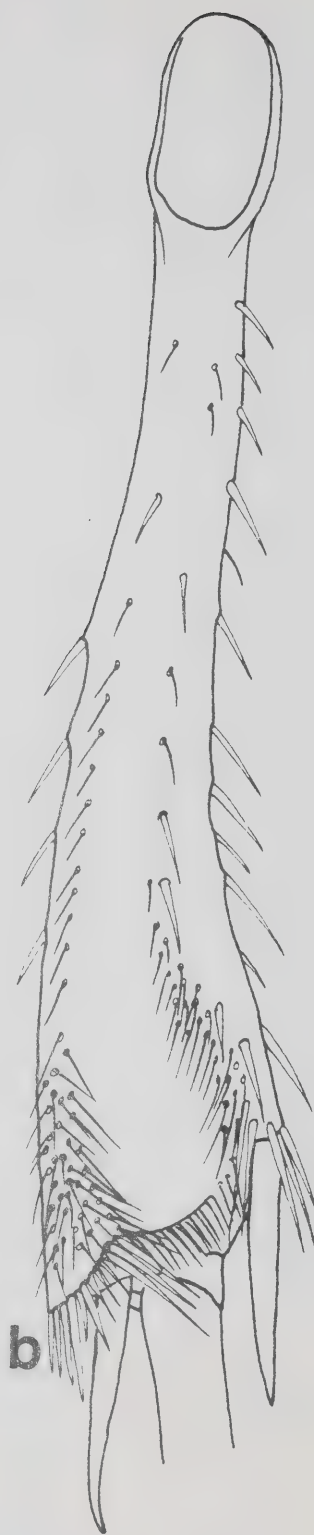
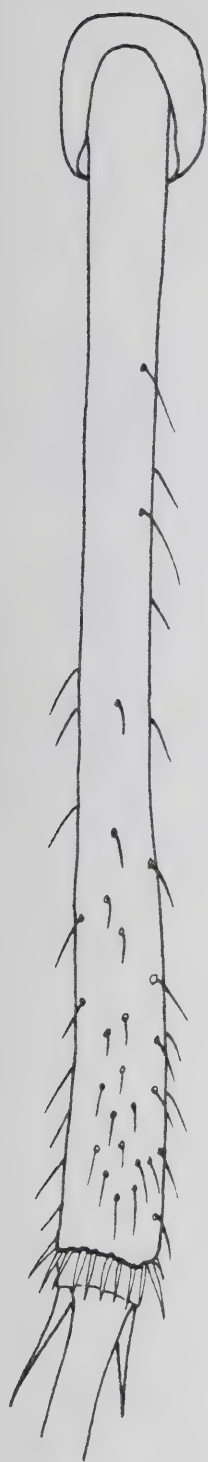


Fig. 236. Right front tibia, Nebria brevicollis (Fabricius) (Nocero, Umbra, Italy), ([a] anterior aspect, [b] posterior aspect). Scale line = 1.0 mm.

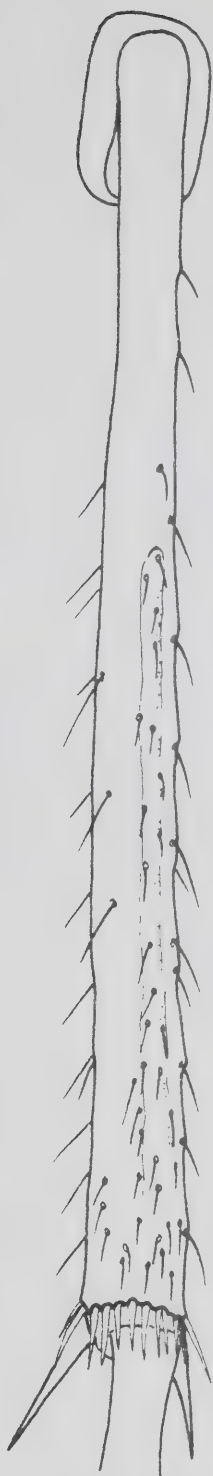
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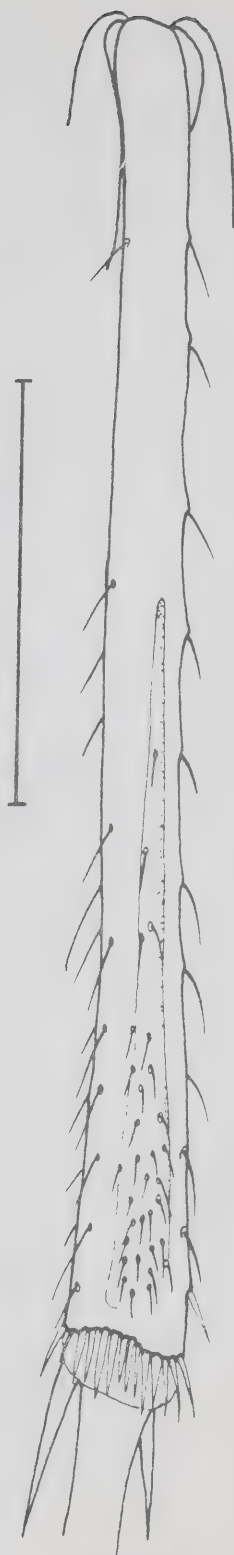
Figs. 237-240. Left middle tibia, lateral aspect. 237. Nebria
pallipes Say) (Ste-Mélanie, Québec). 238. Nebria gouleti new species
(Underwood, Washington). 239. Nebria carri new species (Towsley
Spring, Idaho). 240. Nebria virescens Horn (Vancouver Island, British
Columbia). Scale line = 1.0 mm.



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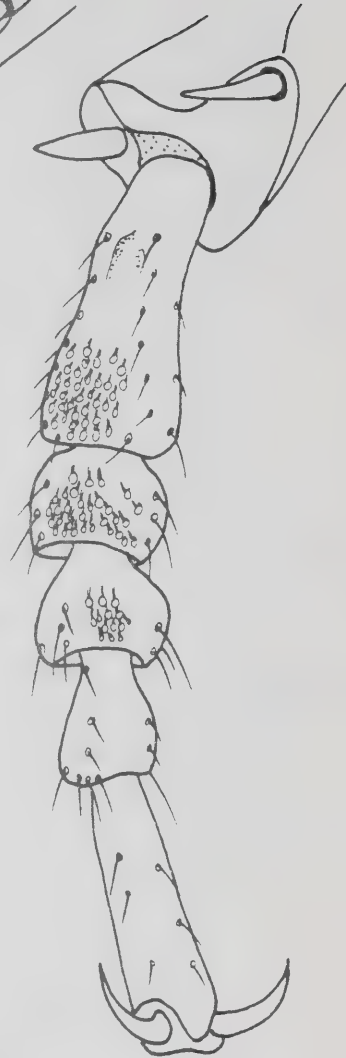
Figs. 241-243. Right front tarsus, ventral aspect, male. 241. Nebria purpurata LeConte (Red River, New Mexico). 242. Nebria ingens ingens Horn (Mount Whitney, California). 243. Nebria ovipennis LeConte (Mount Rose, Nevada). Scale line = 1.0 mm.



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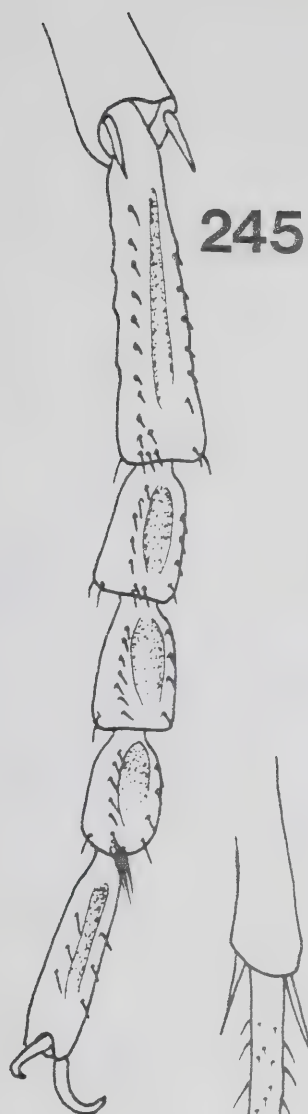
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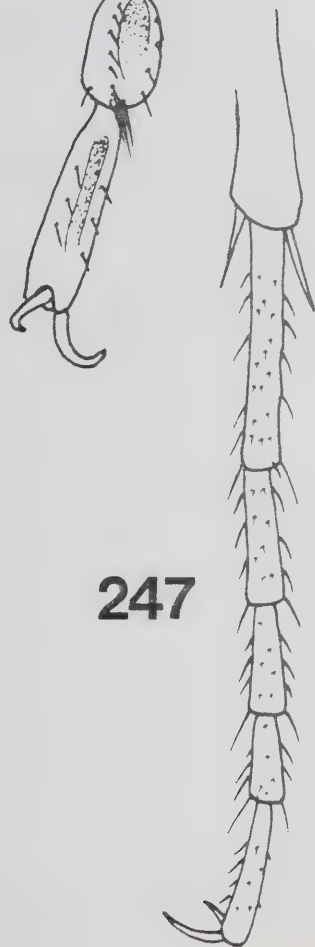
Figs. 244-248. Right hind tarsus, ventral aspect. 244. Nebria purpurata LeConte (Hoosier Pass, Colorado). 245. Nebria ingens ingens Horn (Mount Whitney, California). 246. Nebria ovipennis LeConte ([a] Franklin Lakes, California; [b] Mount Rose, Nevada). 247. Nebria brevicollis (Fabricius) (Chillingham, England). 248. Nebria eschscholtzii Ménétriés (San Bernardino Mountains, California). Scale line = 1.0 mm.



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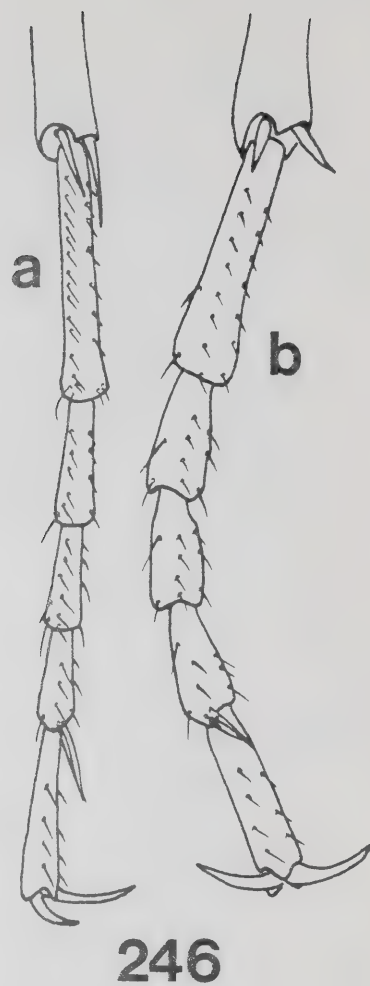
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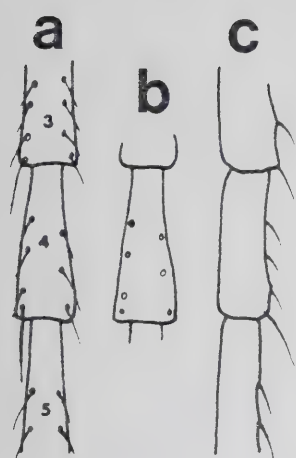
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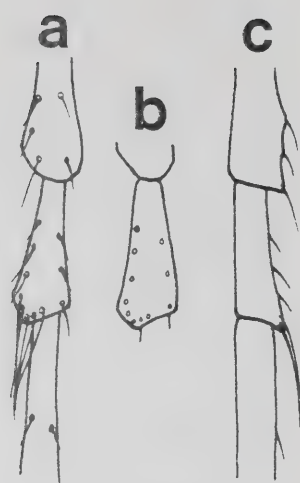
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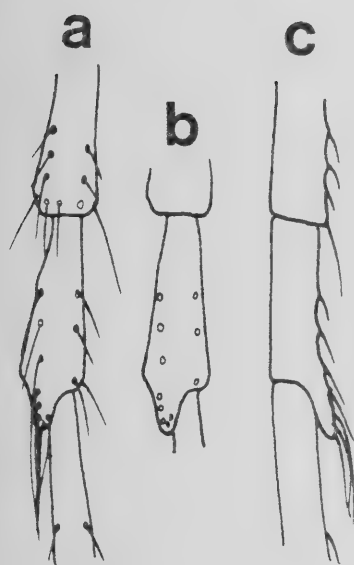
Figs. 249-252. Fourth tarsomere, right hind tarsus ([a] ventral aspect, setae illustrated; [b] ventral aspect, setae not illustrated; [c] lateral aspect). 249. Nebria virescens Horn (Corvallis, Oregon); 3 = third tarsomere; 4 = fourth tarsomere; 5 = fifth tarsomere. 250. Nebria arkansana edwardsi new subspecies (Sheep River, Alberta). 251. Nebria nivalis gaspesiana new subspecies (Mont Albert, Québec). 252. Nebria paradisi Darlington (Mount Hood, Oregon). Scale line = 1.0 mm.



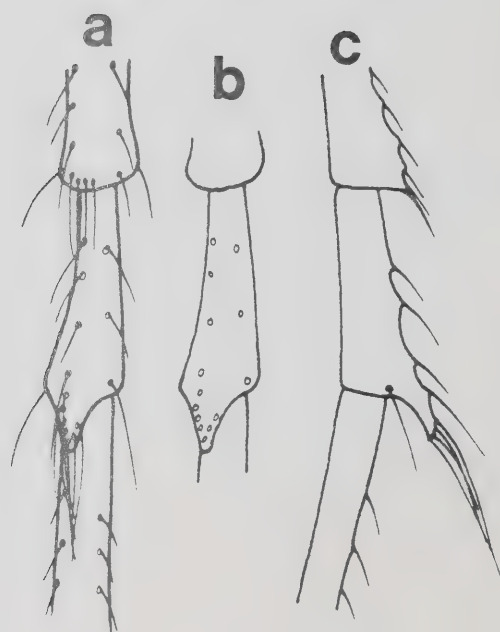
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Figs. 253-254. Abdominal venter, Nebria frigida Sahlberg (Nome, Alaska); AS = anal sternum; HC = hind coxa; HF = hind femur; LP = lateral pit; MTE = metepisternum; MTS = metasternum; PPMP = posterior paramedial puncture; VS1 to VS5 = first to fifth visible sterna. 253. Ventral aspect. 254. Left lateral aspect. Fig. 255. Abdominal venter, ventral aspect, Nebria hudsonica LeConte, male (Clearwater River, Idaho). Fig. 256. Anal sternum, ventral aspect, Nebria hudsonica LeConte, female (Underwood, Washington). Fig. 257. Abdominal venter, ventral aspect, Nebria appalachia Darlington (Mount Mitchell, North Carolina). All scale lines = 1.0 mm.

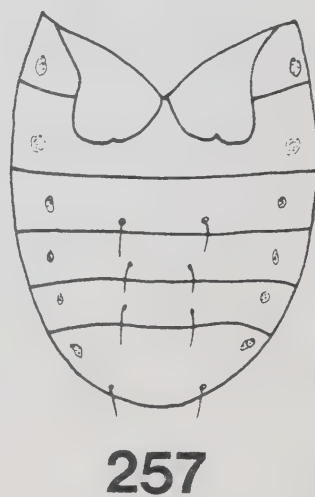
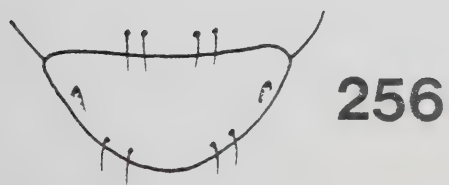
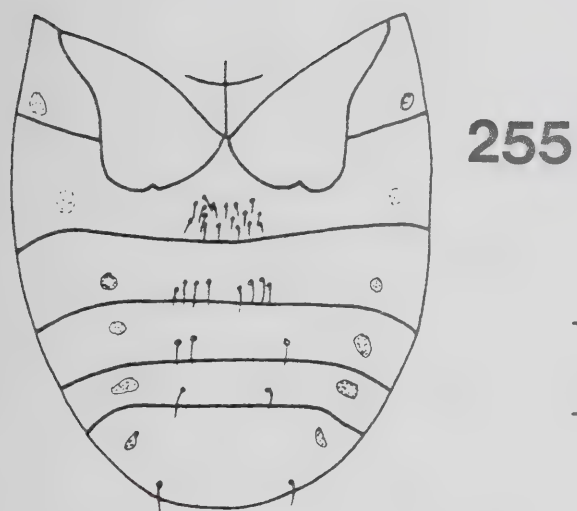
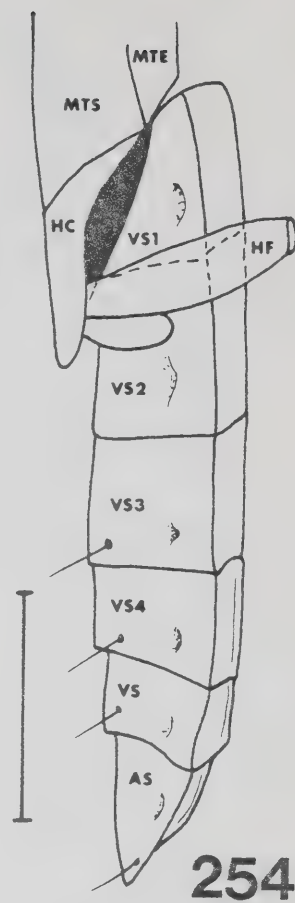
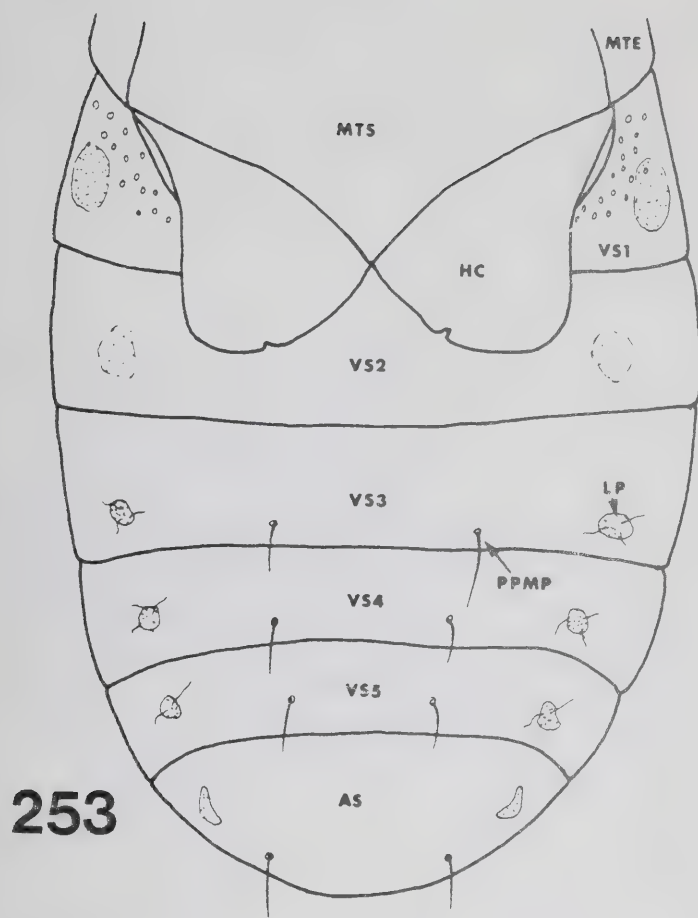
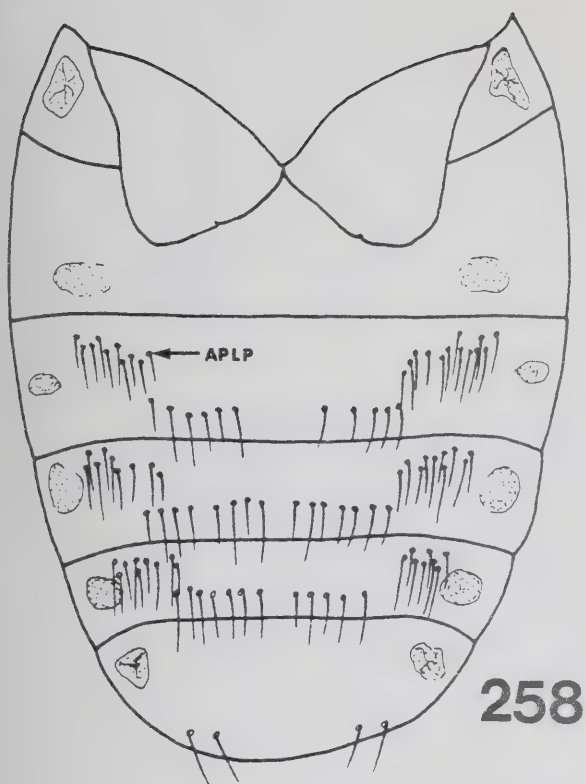
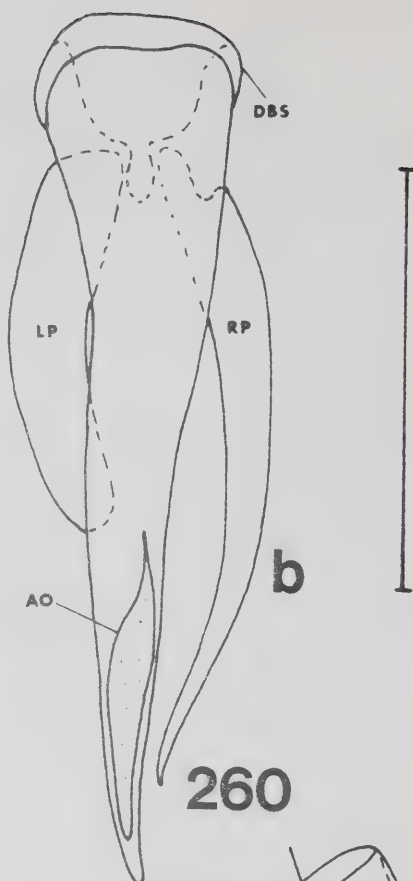


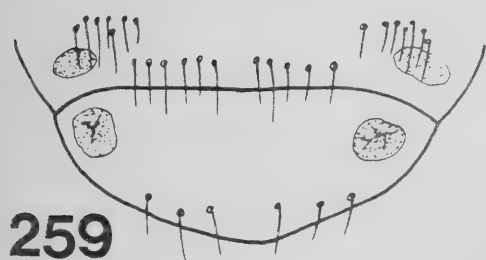
Fig. 258. Abdominal venter, ventral aspect, Nebria vandykei wyeast new subspecies, male (Middle Sister Peak, Oregon); APLP = anterior paralateral puncture. Fig. 259. Anal sternum, ventral aspect, Nebria vandykei wyeast new subspecies, female (Middle Sister Peak, Oregon). Fig. 260. Male genitalia, general form and associated terms ([a] left lateral aspect; [b] dorsal aspect); A = apex of median lobe; AA = angle of bend in axis of median lobe; AO = apical orifice of median lobe; BB = basal bulb of median lobe; BO = basal orifice of median lobe; DBS = dorsobasal sclerite; IS = internal sac; LP = left paramere; MS = mid-shaft of median lobe; PAS pre-apical shaft of median lobe; RP = right paramere. All scale lines = 1.0 mm.



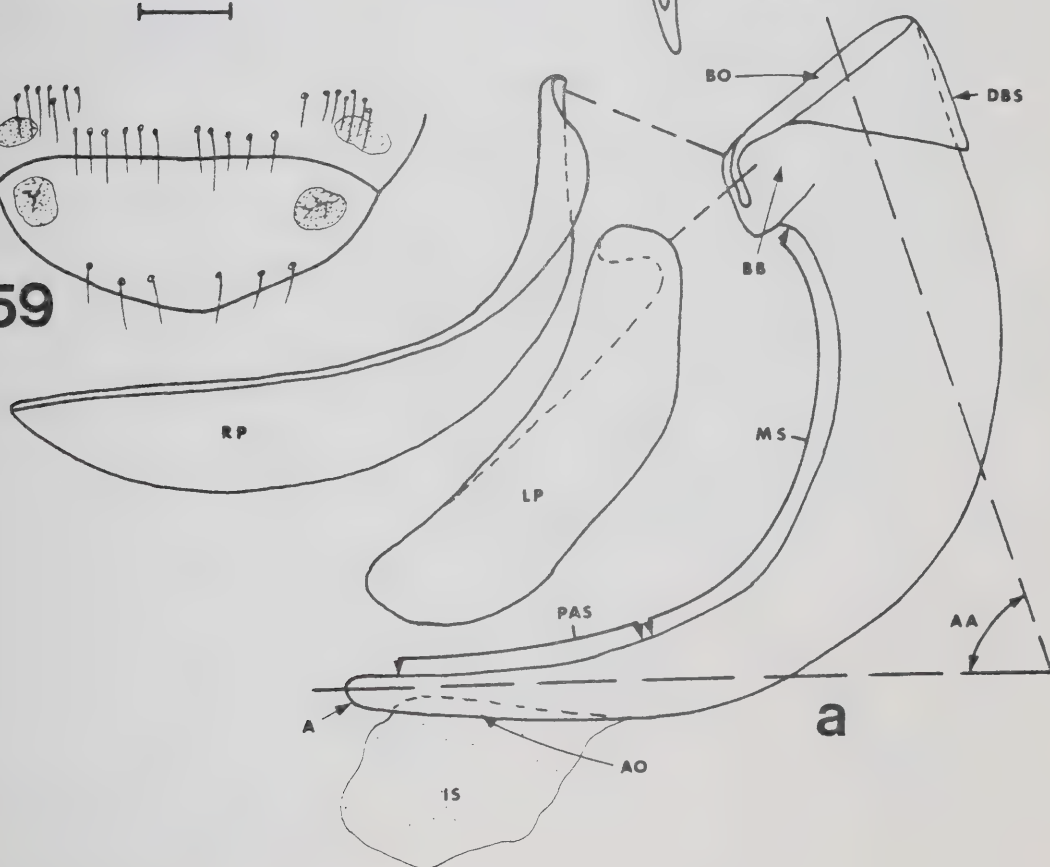
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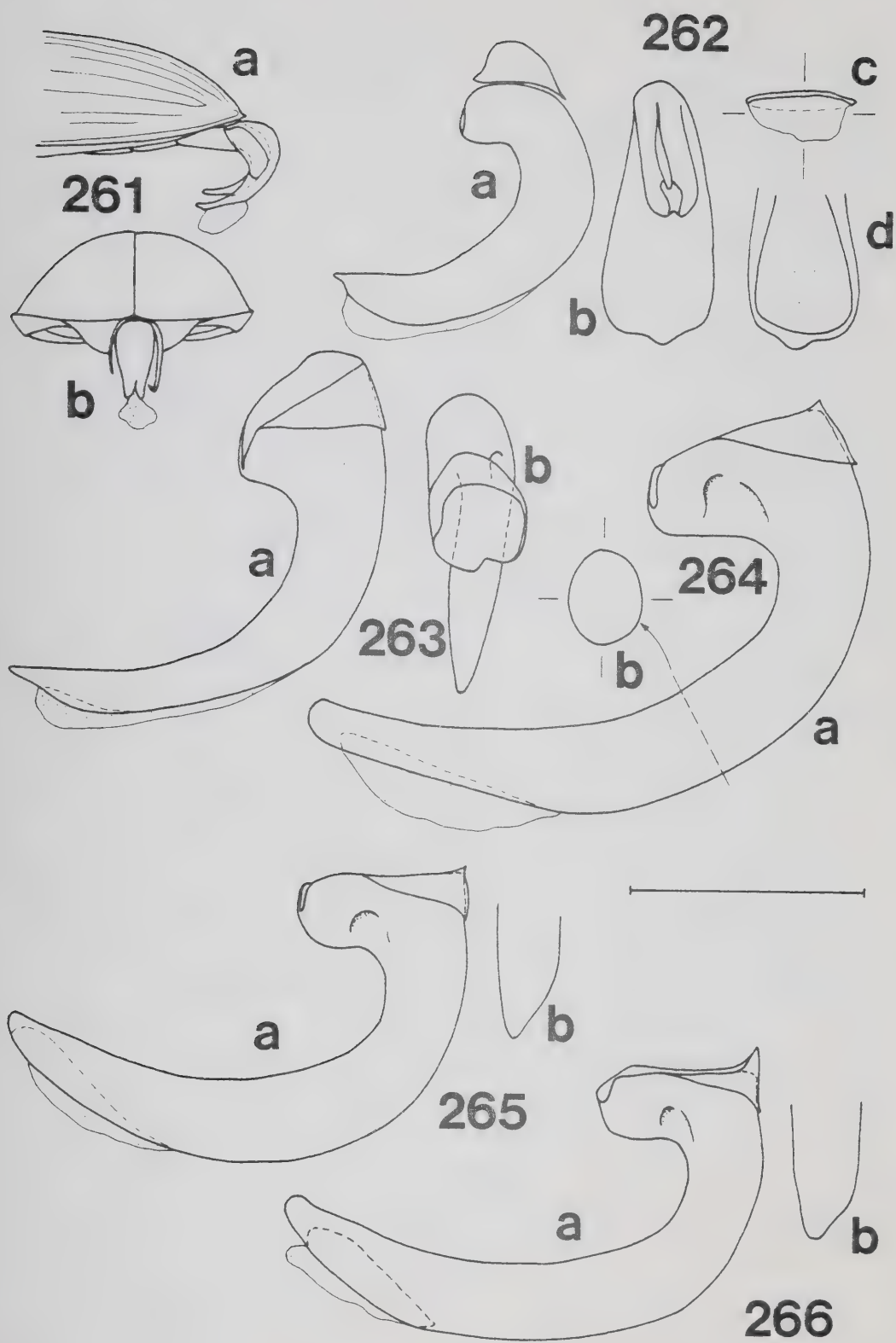


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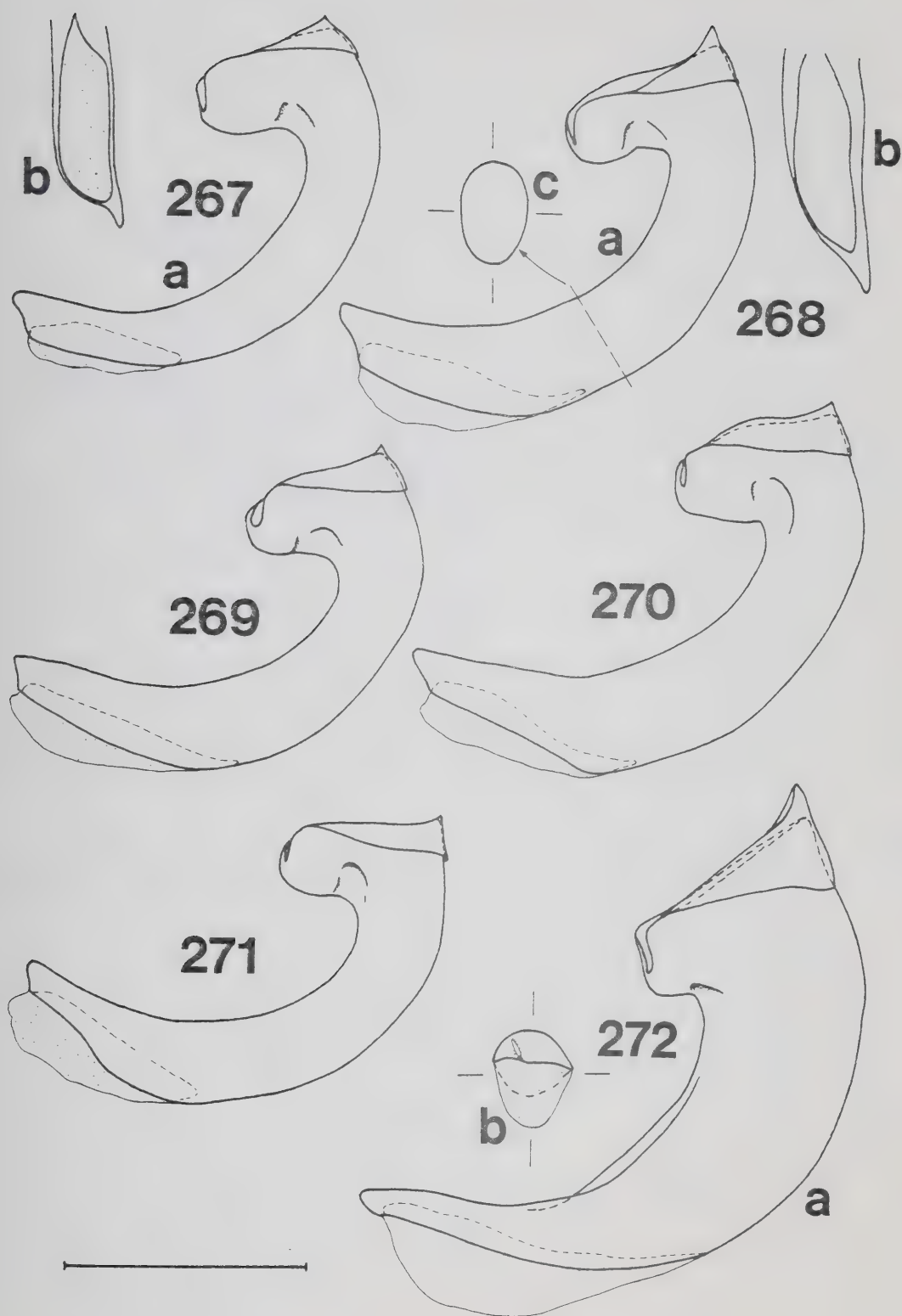


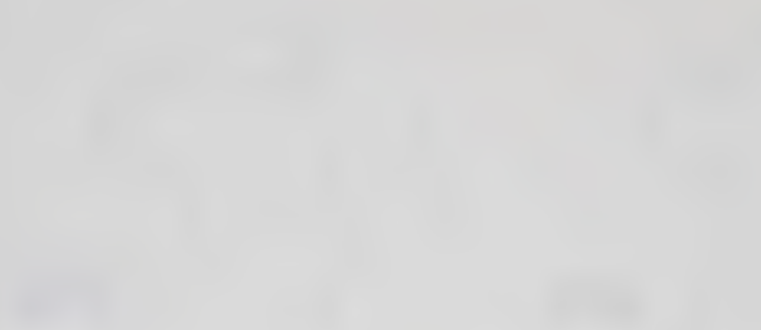
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Fig. 261. Orientation of male genitalic structures in copulatory position ([a] left lateral aspect; [b] posterior aspect). Figs. 262-266. Median lobe of male genitalia. 262. Nebria virescens Horn (Vancouver Island, British Columbia), ([a] left lateral aspect; [b] ventral aspect; [c] apical aspect; [d] dorsal aspect, apical region only). 263. Nebria brevicollis (Fabricius) (Pitlochry, Scotland), ([a] left lateral aspect; [b] ventral aspect). 264. Nebria paradisi Darlington (Mount Rainier, Washington), ([a] left lateral aspect; [b] mid-shaft cross-section). 265. Nebria acuta acuta Lindroth (Mount Rainier, Washington), ([a] left lateral aspect; [b] ventral aspect, apical region only). 266. Nebria acuta quileute new subspecies (Olympic Hot Springs, Washington), ([a] left lateral aspect; [b] ventral aspect, apical region only). Scale line = 1.0 mm.



Figs. 267- 272. Median lobe of male genitalia. 262. Nebria sahlbergii sahlbergii Fischer von Waldheim (Cannon Beach, Oregon), ([a] left lateral aspect; [b] dorsal aspect, apical region only). 268. Nebria arkansana edwardsi new subspecies (Lake Oesa, Yoho National Park, British Columbia), ([a] left lateral aspect; [b] dorsal aspect, apical region only; [c] mid-shaft cross-section). 269. Nebria arkansana oowah new subspecies (La Sal Mountains, Utah), left lateral aspect. 270. Nebria arkansana uinta new subspecies (Logan River, Utah), left lateral aspect. 271. Nebria fragilis fragilis Casey (North Fork Provo River, Utah), left lateral aspect. 272. Nebria desolata Kavanaugh (11 miles southeast of Boulder, Utah), ([a] left lateral aspect; [b] apical aspect). Scale line = 1.0 mm.

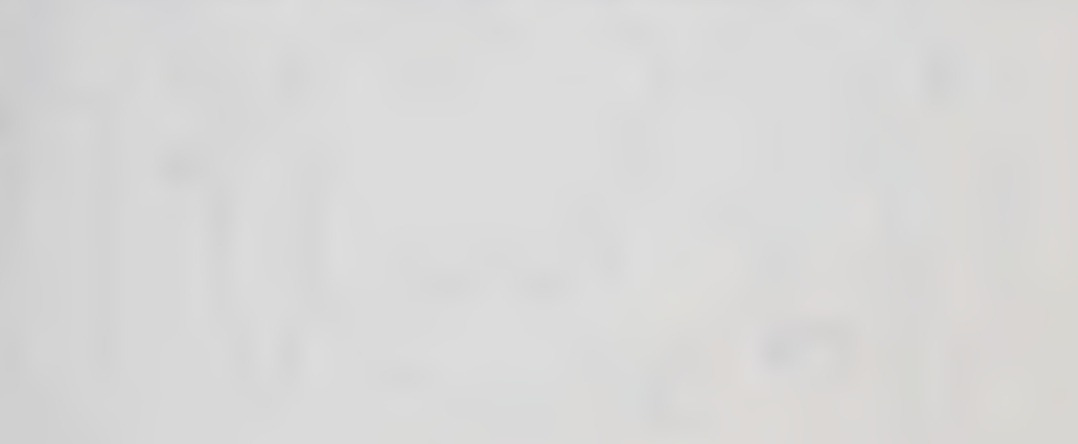




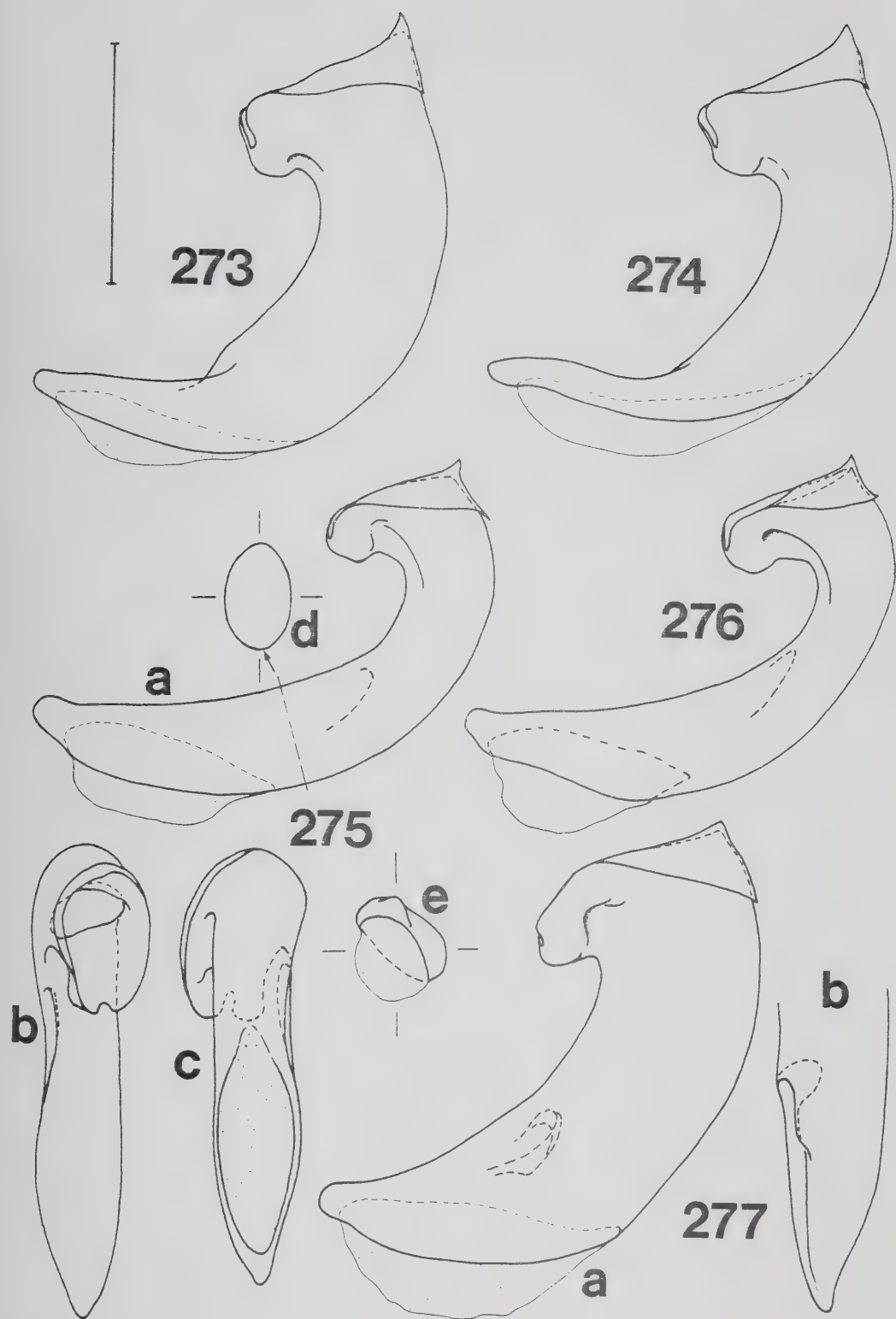
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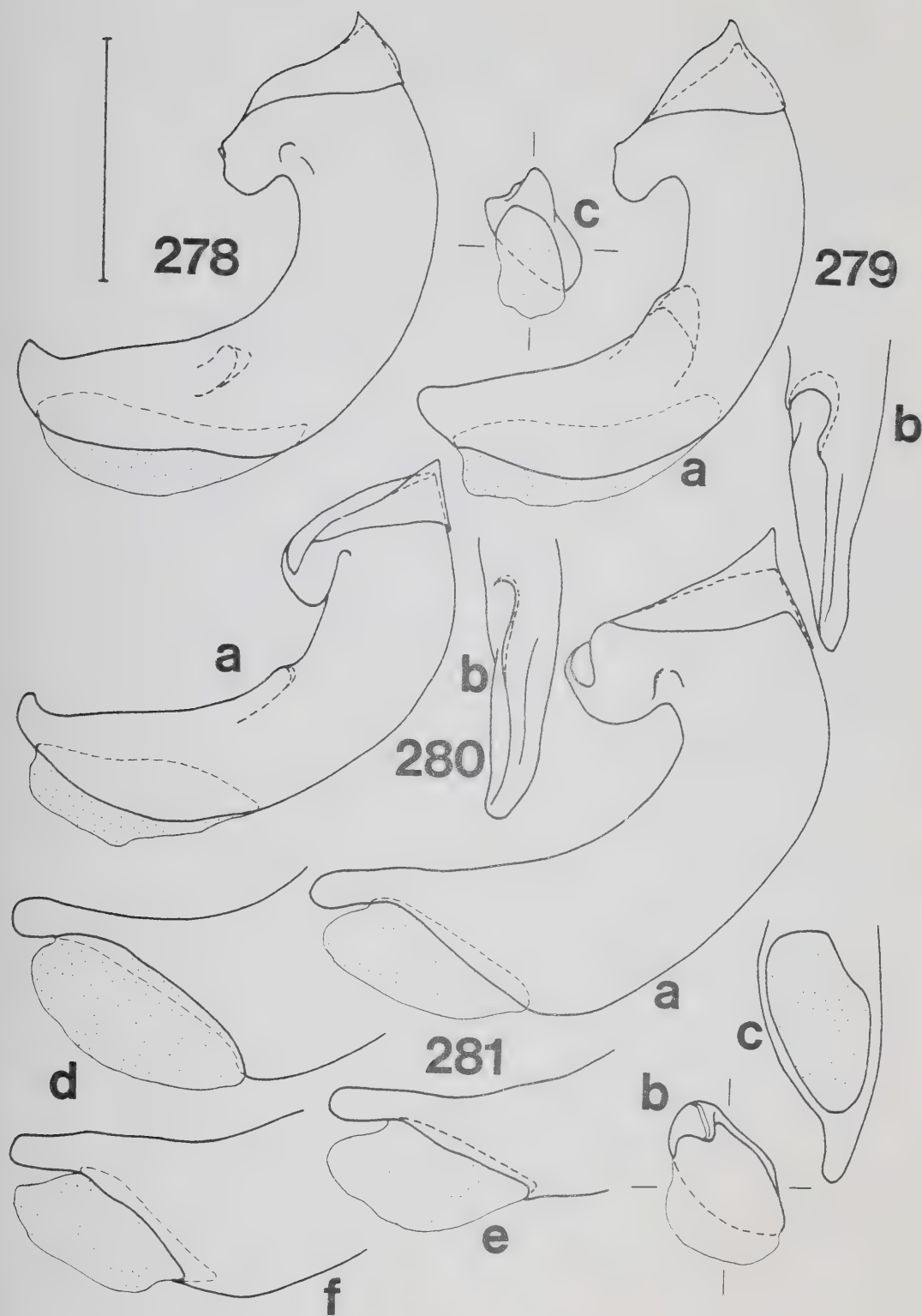
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Figs. 273- 277. Median lobe of male genitalia. 273. Nebria navajo new species (19 miles southwest of Kayenta, Arizona), left lateral aspect. 274. Nebria eschscholtzii Ménétriés (10 miles southwest of Bickelton, Washington), left lateral aspect. 275. Nebria gebleri gebleri Dejean (Waterton Park, Alberta), ([a] left lateral aspect; [b] ventral aspect; [c] dorsal aspect; [d] mid-shaft cross-section; [e] apical aspect). 276. Nebria gebleri strawberriensis new subspecies (Strawberry Mountains, Oregon), left lateral aspect. 277. Nebria carri new species (Dollarhide Summit, Idaho), ([a] left lateral aspect; [b] ventral aspect, apical region only). Scale line = 1.0 mm.

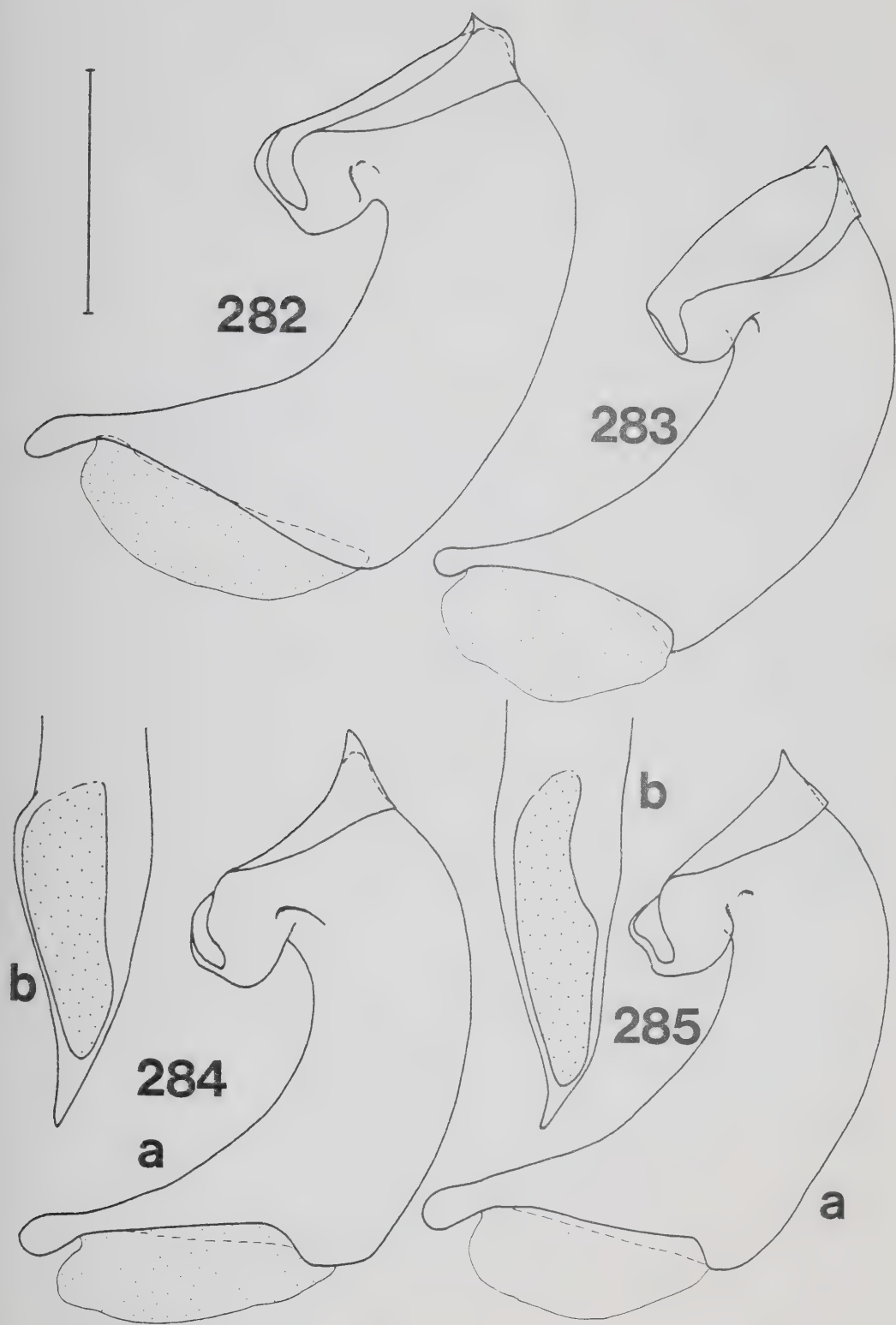


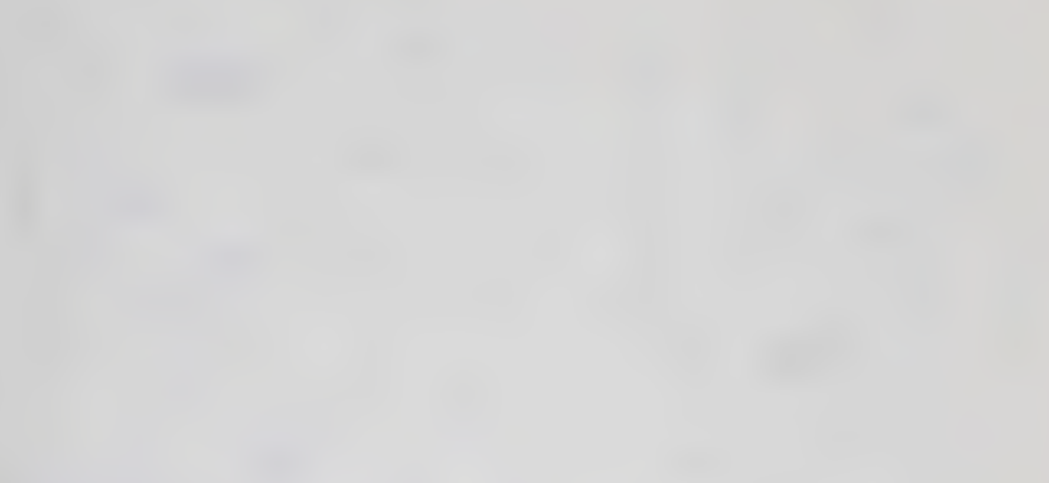
Figs. 278- 281. Median lobe of male genitalia. 273. Nebria kincaidi kincaidi Schwarz (Olympic Hot Springs, Washington), left lateral aspect. 279. Nebria spatulata sierrae new subspecies (Mono County, California), [a] left lateral aspect; [b] ventral aspect, apical region only; [c] apical aspect). 280. Nebria ovipennis LeConte (Franklin Lakes, California), ([a] left lateral aspect; [b] ventral aspect, apical region only). 281. Nebria trifaria trifaria LeConte, ([a] American Fork Canyon, Utah, left lateral aspect; [b] same locality, apical aspect; [c] same locality, dorsal aspect, apical region only; [d] Cedar Breaks National Monument, Utah, left lateral aspect; [e] Grand Teton National Park, Wyoming, left lateral aspect; [f] Ward, Colorado, left lateral aspect). Scale line = 1.0 mm.



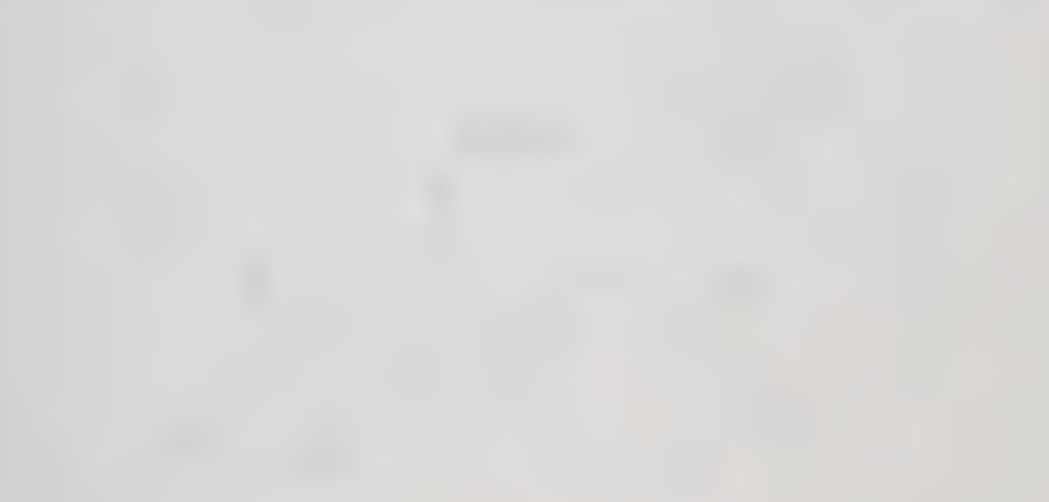
Figs. 282-285. Median lobe of male genitalia. 282. Nebria trifaria catenata Casey (Wolf Creek Pass, Colorado), left lateral aspect. 283. Nebria trifaria utahensis new subspecies (Henry Mountains, Utah), left lateral aspect. 284. Nebria coloradensis Van Dyke (Quandary Peak, Colorado), ([a] left lateral aspect; [b] dorsal aspect, apical region only). 285. Nebria piute Erwin and Ball (Circleville Mountain, Utah), ([a] left lateral aspect; [b] dorsal aspect, apical region only).

Scale line = 1.0 mm.

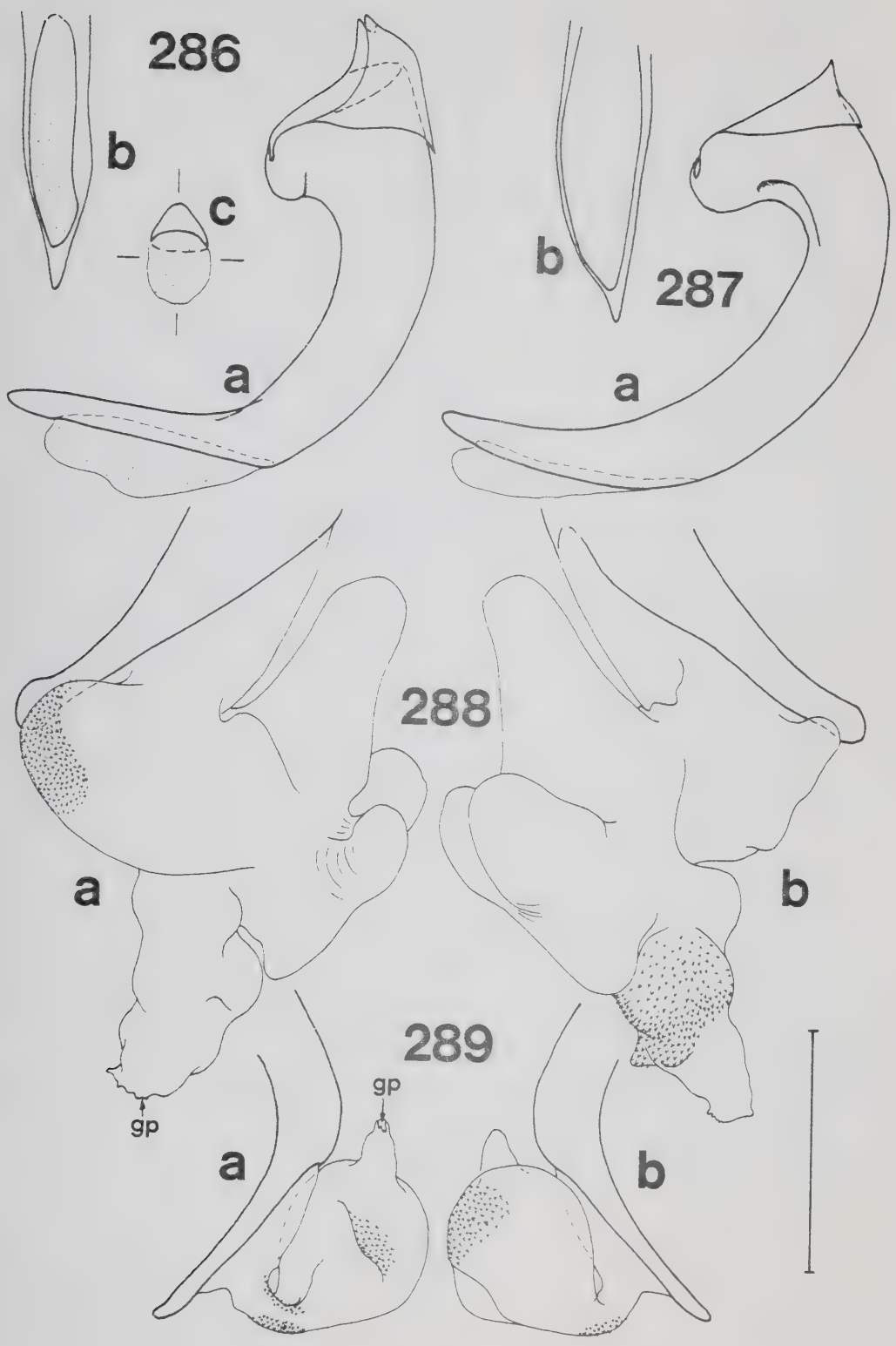




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Figs. 286-287. Median lobe of male genitalia. 286. Nebria gouleti new species (Bayhorse Creek, Idaho), ([a] left lateral aspect; [b] dorsal aspect, apical region only; [c] apical aspect). 287. Nebria zioni oasis new subspecies (Pine Valley Mountains, Utah), ([a] left lateral aspect; [b] dorsal aspect, apical region only). Figs. 288-289. Internal sac of median lobe, ([a] left lateral aspect; [b] right lateral aspect). 288. Nebria vandykei vandykei Bänninger (Mount Rainier, Washington). 289. Nebria gyllenhali castanipes (Kirby) (Edmonton, Alberta). Scale line = 1.0 mm.



Figs. 290-291. Parameres, Nebria virescens Horn (Vancouver Island, British Columbia). 290. Right paramere, lateral aspect. 291. Left paramere, lateral aspect. Fig. 291A. Left paramere, lateral aspect, Nebria paradisi Darlington (Mount Rainier, Washington). Figs. 292-293. Parameres, Nebria gouleti new species (Bayhorse Creek, Idaho). 292. Right paramere, lateral aspect. 293. Left paramere, lateral aspect. Fig. 294. Parameres, Nebria brevicollis (Fabricius) (Pitlochry, Scotland), ([a] right paramere, lateral aspect; [b] left paramere, lateral aspect). Fig. 295. Left paramere, lateral aspect, Nebria ovipennis LeConte (Franklin Lakes, California). Fig. 296. Right paramere, medial aspect, Nebria schwarzi beverlianna new subspecies (Hoback River, Wyoming); mps = medial parameric sclerite. Fig. 297. Ring sclerite in relation to median lobe; ([a] dorsal aspect; [b] ventral aspect). Fig. 298. Ring sclerite, Nebria, generalized, ([a] dorsal aspect; [b] posterior aspect); n = notch through which passes duct of pygidial defense gland; ps = pouch sclerite; t9 = ninth tergum. Fig. 299. Ring sclerite, dorsal aspect, Amphizoa lecontei Matthew. All scale lines = 1.0 mm.

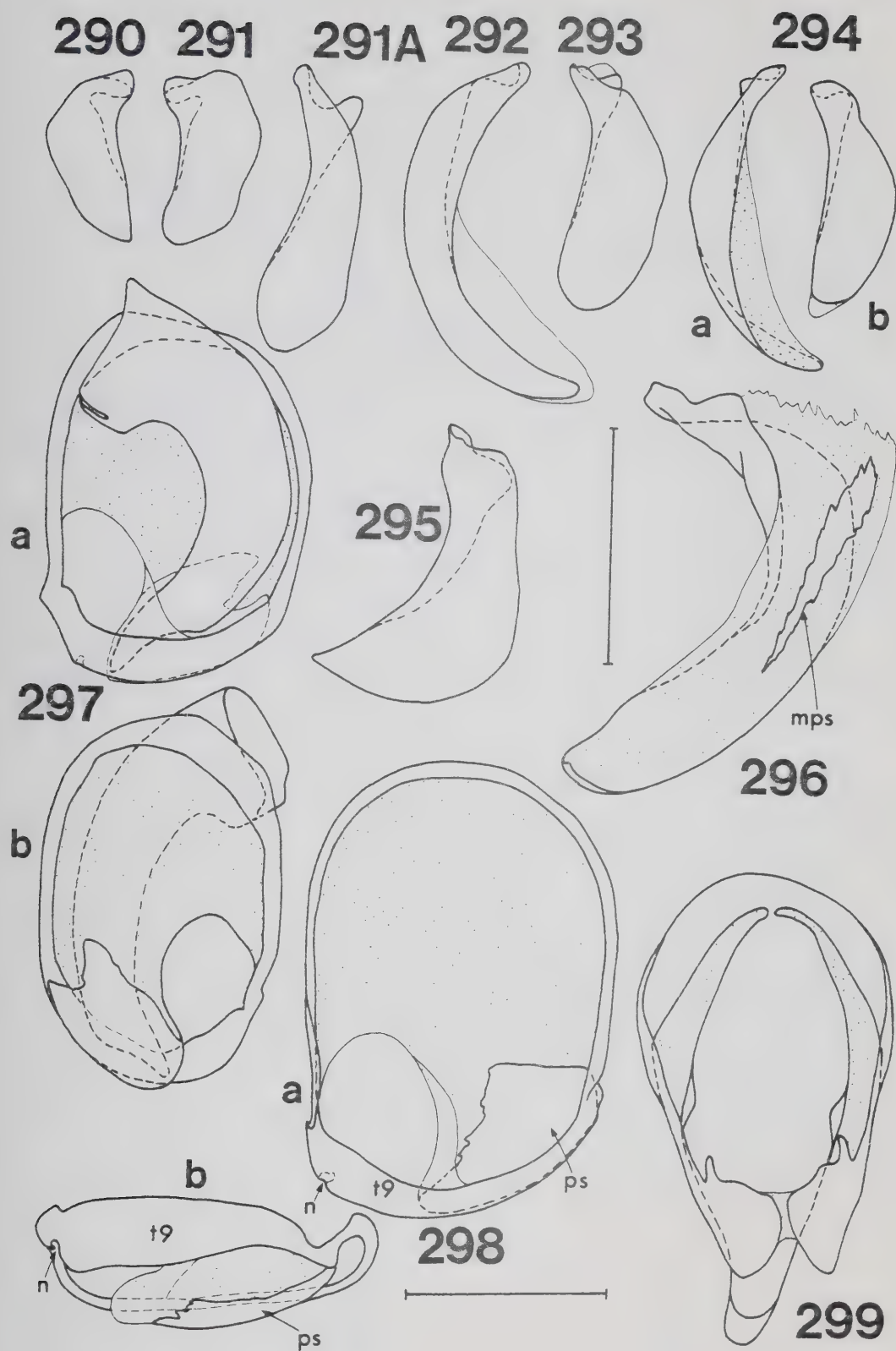
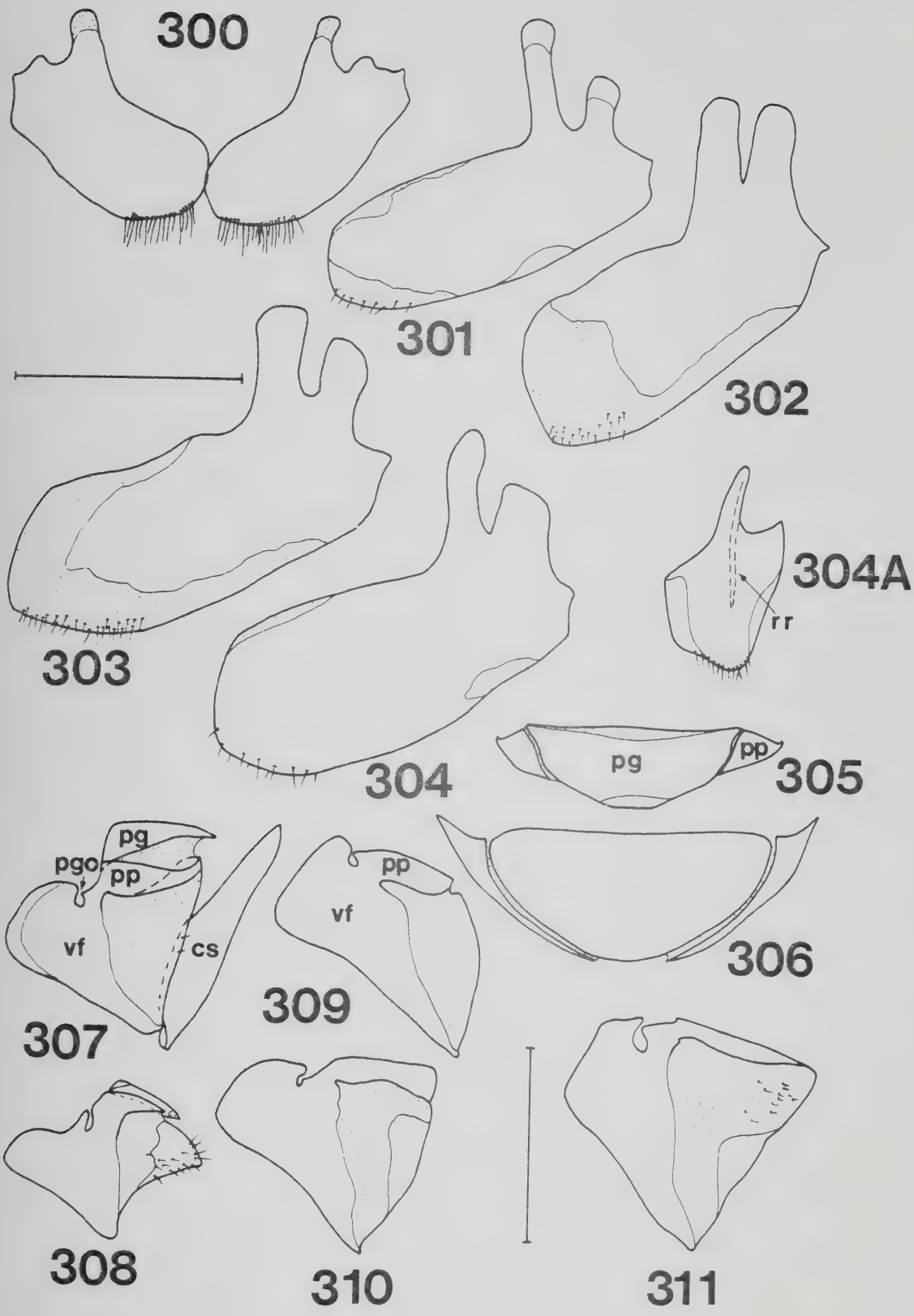


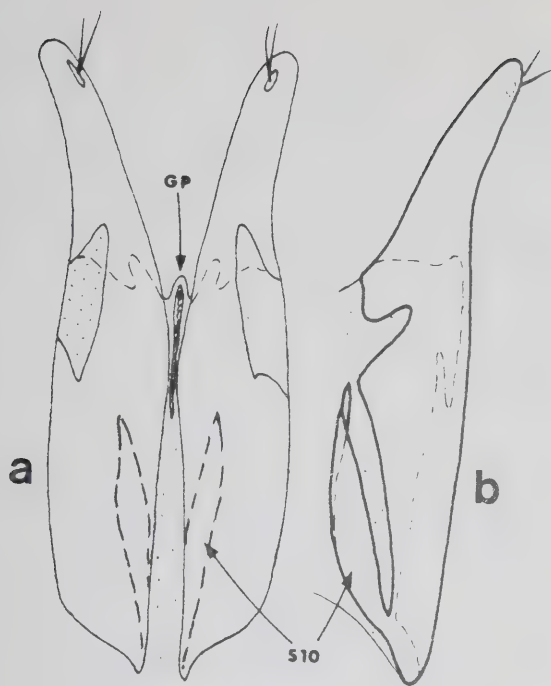


Fig. 300. Eighth sternum (both hemisternites), ventral aspect, Nebria virescens Horn (Vancouver Island, British Columbia). Figs. 301-304A. Eighth sternum (left hemisternite only), ventral aspect. 301. Nebria metallica Fischer von Waldheim (White River, Washington). 302. Nebria gouleti new species (Clearwater River, Idaho). 303. Nebria paradisi Darlington (Mount Rainier, Washington). 304. Nebria carri new species (Dollarhide Summit, Idaho). 304A. Trachypachus gibbsi LeConte (Eugene, Oregon). Figs. 305-306. Proctiger and paraprocts, ventral aspect. 305. Nebria virescens Horn (Vancouver Island, British Columbia). 306. Nebria diversa LeConte (Waldport, Oregon). Figs. 307-311. Valvifer and paraproct, left lateral aspect; cs = coxostylus; pg = proctiger; pgo = notch which bears orifice of duct of pygidial defense gland; pp = paraproct; vf = valvifer. 307. Nebria arkansana edwardsi new subspecies (Glacier National Park, Montana). 308. Nebria virescens Horn (Vancouver Island, British Columbia). 309. Nebria lacustris bellorum new subspecies (West Prong Little Pigeon River, Tennessee). 310. Nebria lyelli Van Dyke (Mount Lyell, California). 311. Nebria gregaria Fischer von Waldheim (Unalaska Island, Aleutian Islands). All scale lines = 1.0 mm.





Figs. 312-314. Coxostyli and tenth sternum; GP = gonopore; S10 = tenth sternum (single or as paired hemisternites). 312. Nebria paradisi Darlington (Mount Rainier, Washington), ([a] ventral aspect; [b] right coxostylus and right tenth hemisternite, medial aspect). 313. Nebria suturalis LeConte (Columbia Icefields, Alberta), right coxostylus and right tenth hemisternite, medial aspect. 314. Amphizoa lecontei Matthew (Hoback River, Wyoming), ventral aspect. Scale line = 1.0 mm.

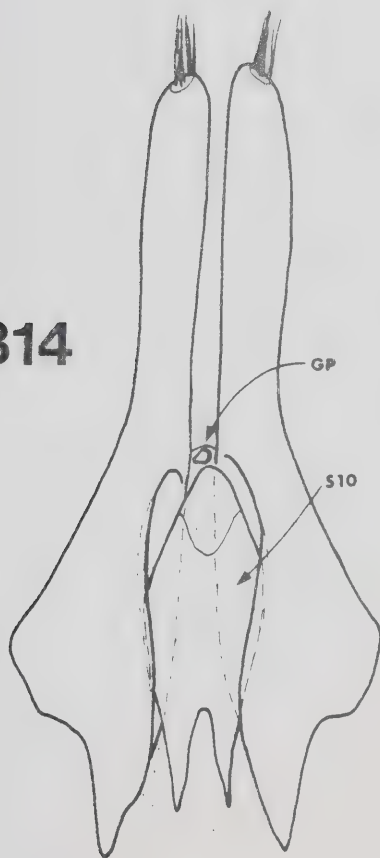


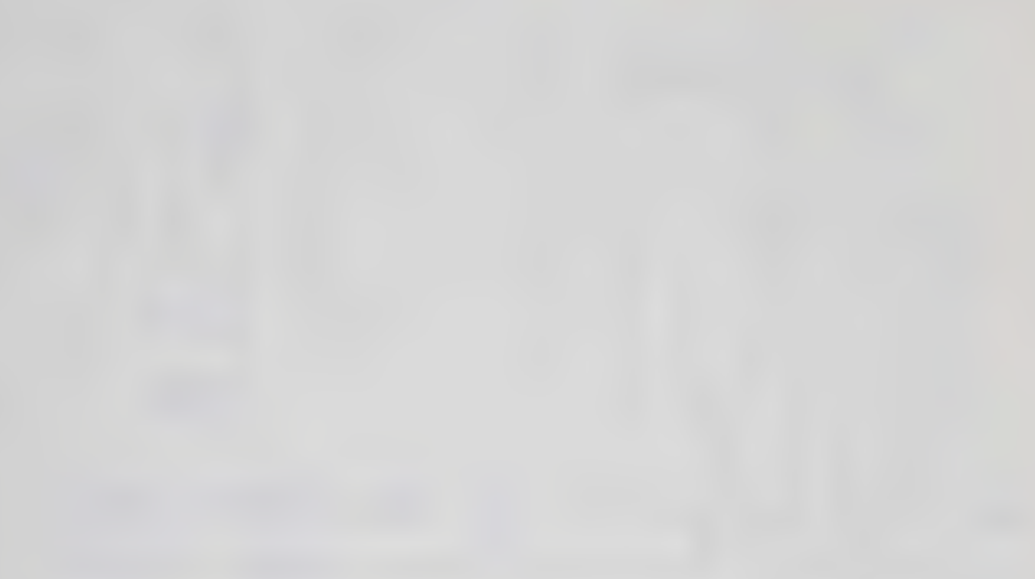
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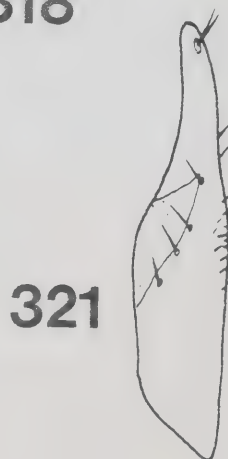
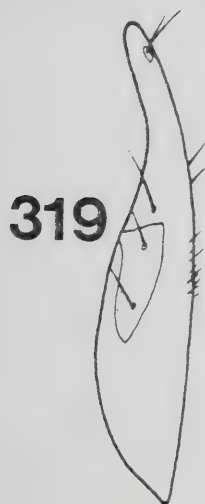
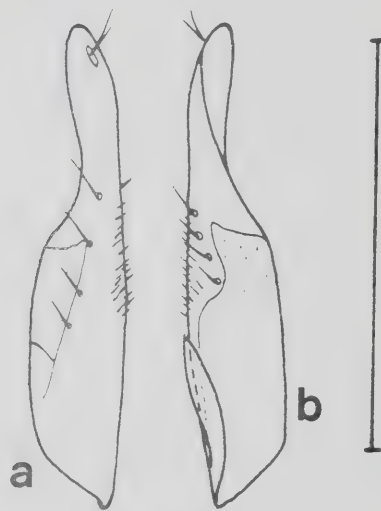
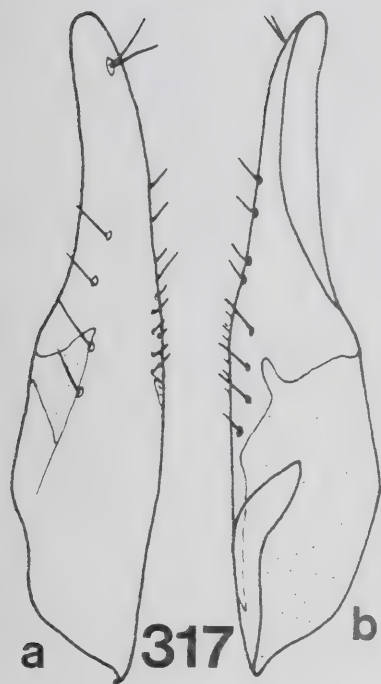
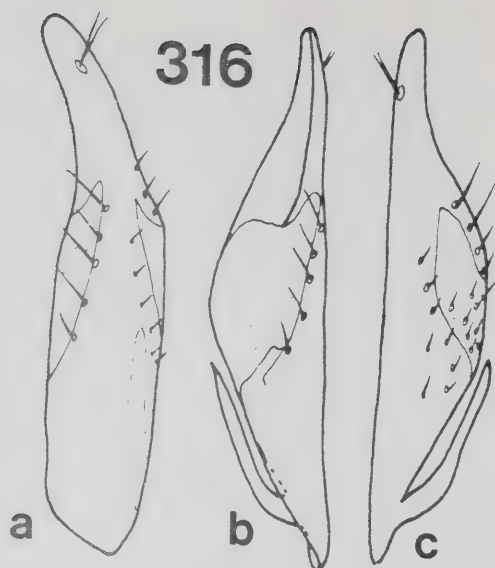
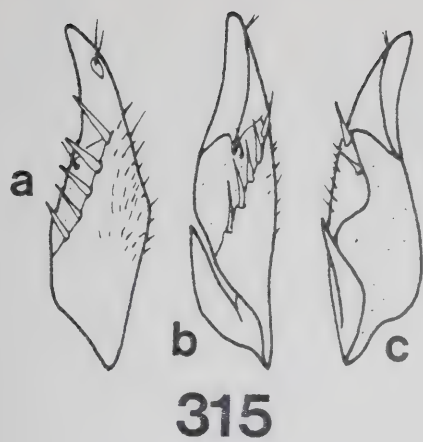




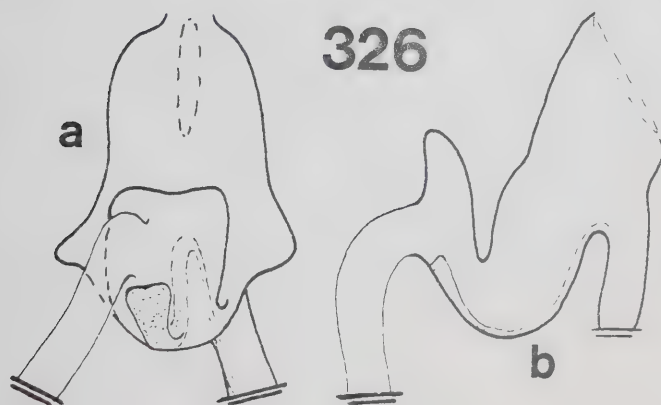
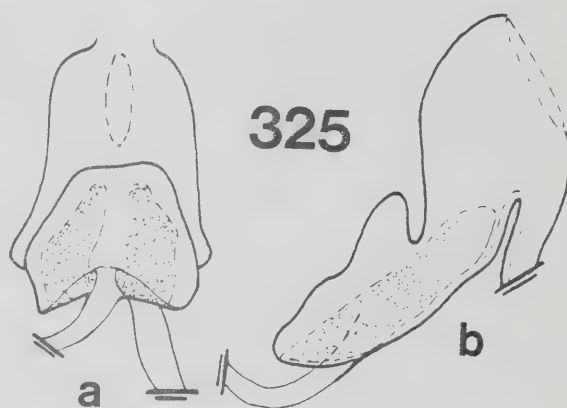
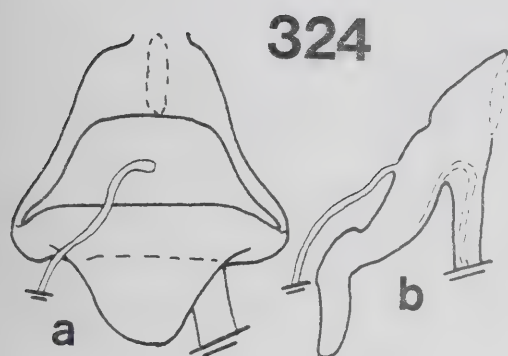
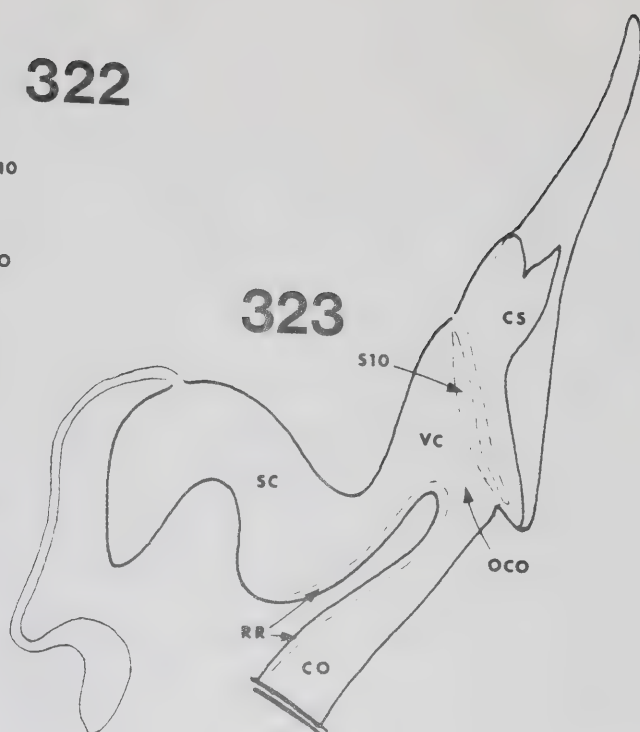
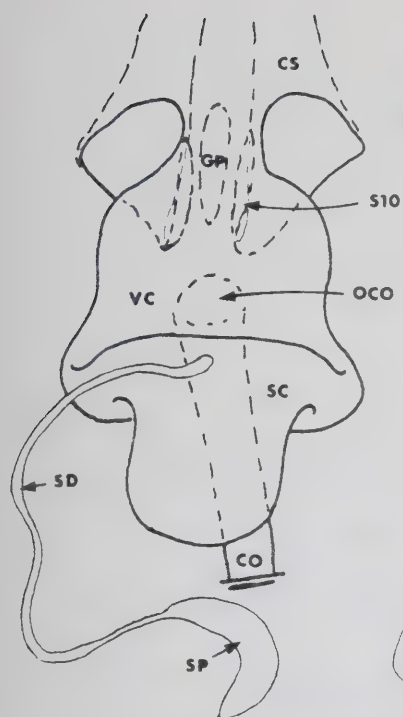
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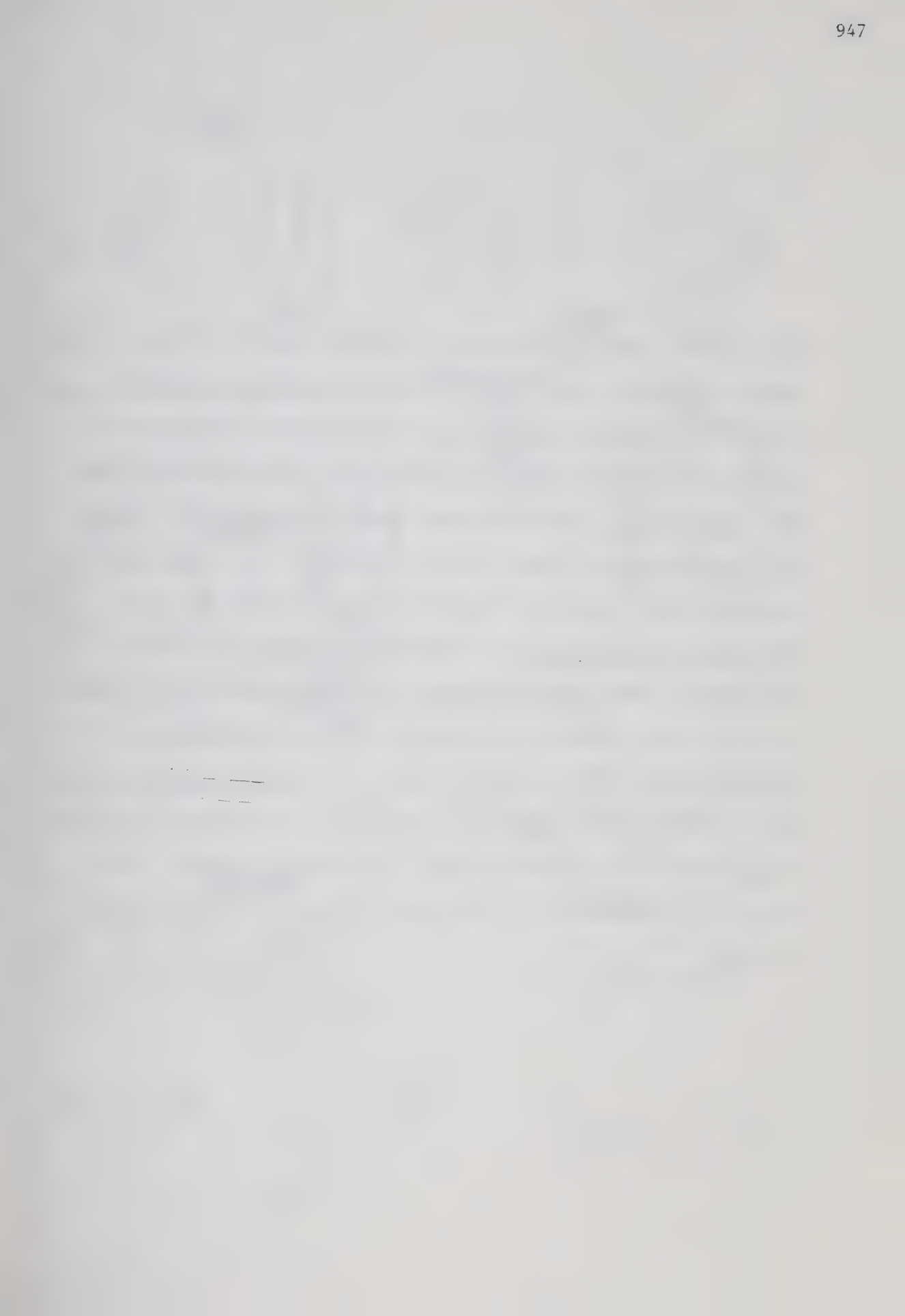


Figs. 315-321. Left coxostylus. 315. Nebria virescens Horn (Vancouver, British Columbia), ([a] ventral aspect; [b] lateral aspect; [c] dorsal aspect). 316. Nebria darlingtoni new species (Riverton, California), ([a] ventral aspect; [b] lateral aspect; [c] medial aspect). 317. Nebria piperi Van Dyke (Mount Rainier, Washington), ([a] ventral aspect; [b] dorsal aspect). 318. Nebria gebleri gebleri Dejean (Waterton Park, Alberta), ([a] ventral aspect; [b] dorsal aspect). 319. Nebria gyllenhali castanipes (Kirby) (Mount Washington, New Hampshire), ventral aspect. 320. Nebria nivalis nivalis (Paykull) (Cold Bay, Alaska), ventral aspect. 321. Nebria zioni zioni Van Dyke (Cedar Canyon, Utah), ventral aspect. Scale line = 1.0 mm.



Figs. 322-323. Bursa copulatrix and associated structures, general form and associated terms; CO = common oviduct; CS = coxostylus; GP = gonopore; OCO = orifice of common oviduct on bursa copulatrix; RR = reinforcement rod; SC = spermathecal chamber of bursa; SD = spermathecal duct; SP = spermatheca; SlO = tenth sternum; VC = vestibular chamber of bursa. 322. Ventral aspect. 323 Left lateral aspect. Figs. 324-326. Bursa copulatrix, ([a] ventral aspect; [b] left lateral aspect); stippled areas denote shape and location of distinct sclerites or moderately to markedly sclerotized, but less clearly defined, areas. 324. Nebria virescens Horn (Vancouver, British Columbia). 325. Nebria hudsonica LeConte (Hoback Junction, Wyoming). 326. Nebria crassicornis crassicornis Van Dyke (Mount Rainier, Washington). Scale line = 1.0 mm.

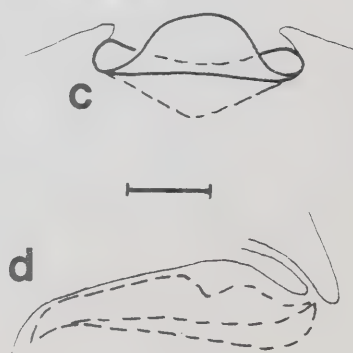
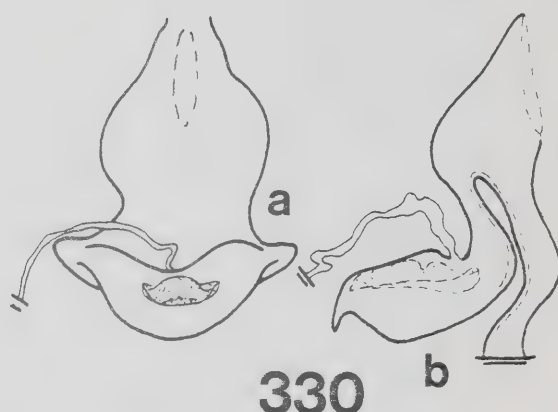
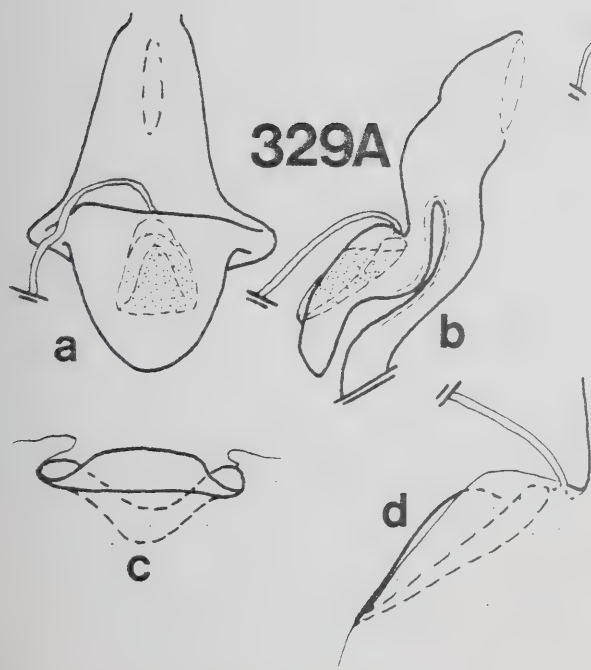
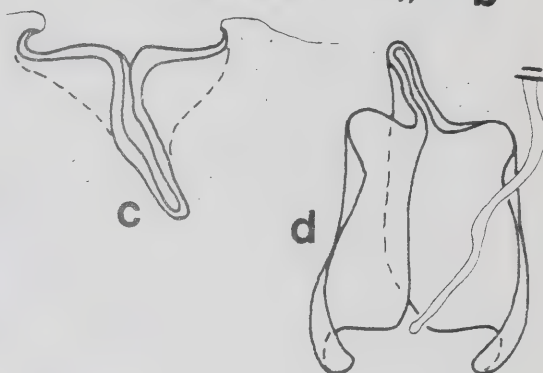
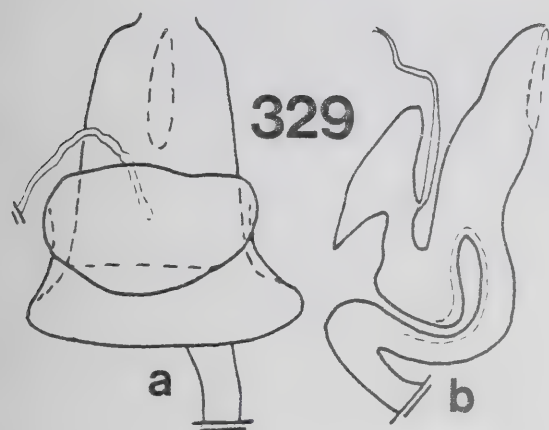
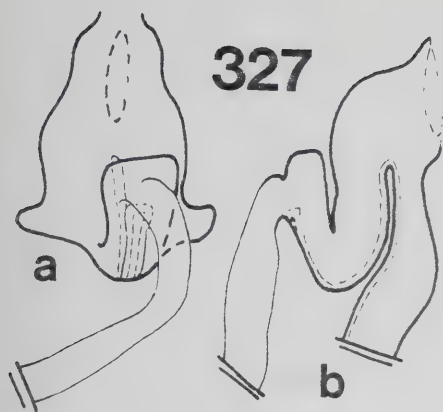




Figs. 327-330. Bursa copulatrix; ([a] ventral aspect; [b] left lateral aspect; [c] and [d] bursal sclerite enlarged, varied in aspect); stippled areas denote shape and location of distinct sclerites or moderately to markedly sclerotized, but less clearly defined, areas.

327. Nebria frigida Sahlberg (Eagle Summit, Alaska). 328. Nebria acuta acuta Lindroth (Mount Rainier, Washington), ([c] sclerite enlarged, dorsal aspect; [d] sclerite enlarged, posterior aspect).

329. Nebria acuta quileute new subspecies (Olympic Hot Springs, Washington). 329A. Nebria sahlbergii sahlbergii Fischer von Waldheim (Medicine Lake, Alberta), ([c] sclerite enlarged, dorsal aspect; [d] sclerite enlarged, left lateral aspect). 330. Nebria sahlbergii modoc new subspecies (Warner Mountains, California), ([a] sclerite enlarged, dorsal aspect; [b] sclerite enlarged, left lateral aspect). Scale line for [a]'s and [b]'s = 1.0 mm; scale line for [c]'s and [d]'s = 0.10 mm.





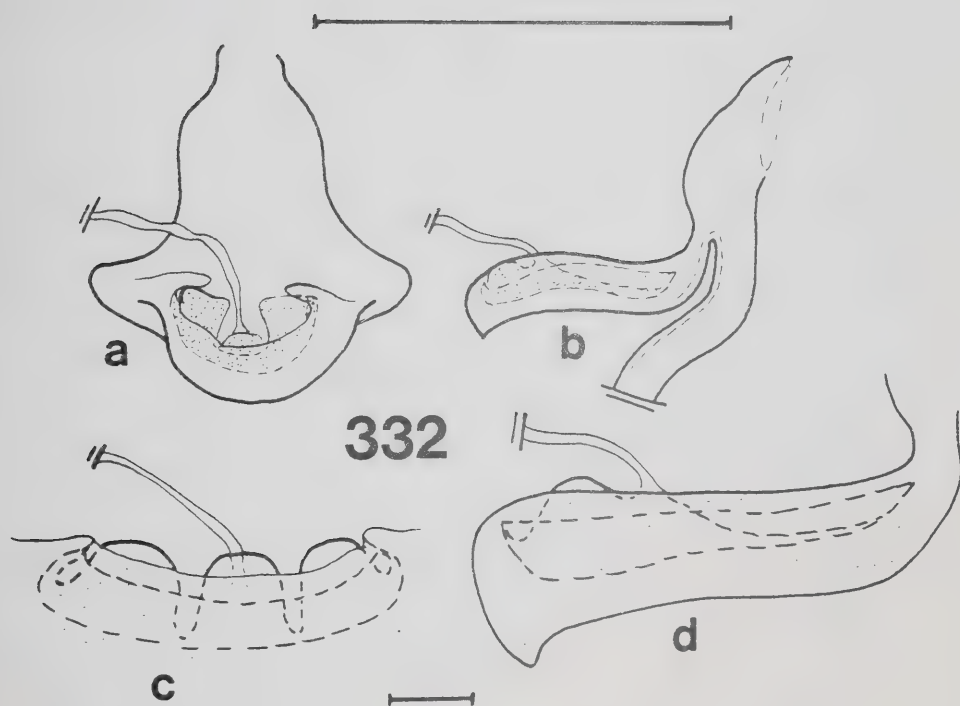
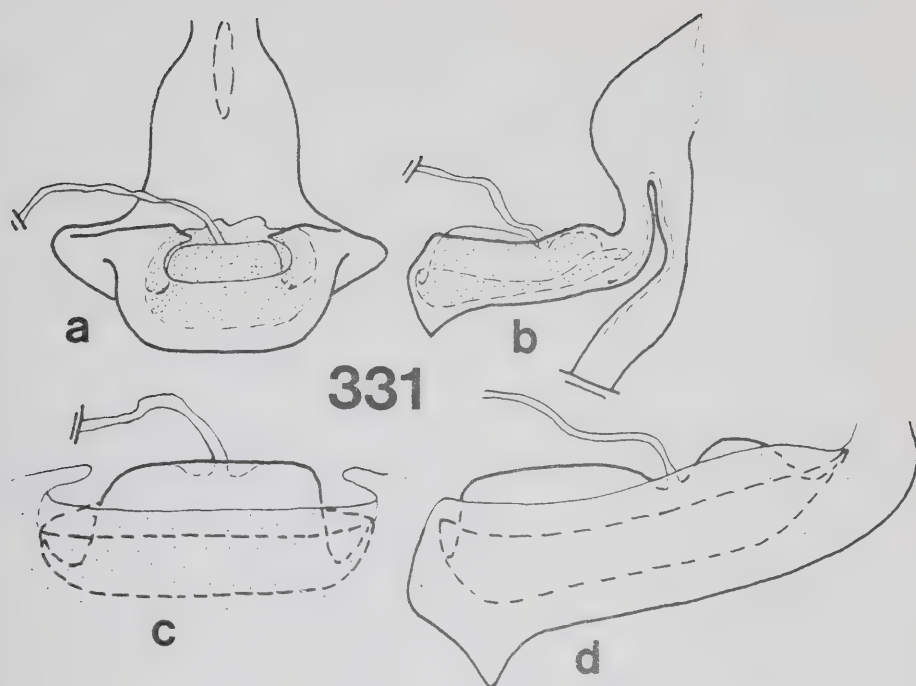
The first of these is the fact that the bird is not a sparrow, as it is too large and has a different shape. It is a member of the family *Corvidae*, which includes crows, ravens, and magpies. The second is that it is not a crow, as it has a different color and shape. It is a member of the genus *Corvus*, which includes crows and ravens. The third is that it is not a raven, as it is too small and has a different shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The fourth is that it is not a magpie, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The fifth is that it is not a crow, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The sixth is that it is not a raven, as it is too small and has a different shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The seventh is that it is not a magpie, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The eighth is that it is not a crow, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The ninth is that it is not a raven, as it is too small and has a different shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The tenth is that it is not a magpie, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens.



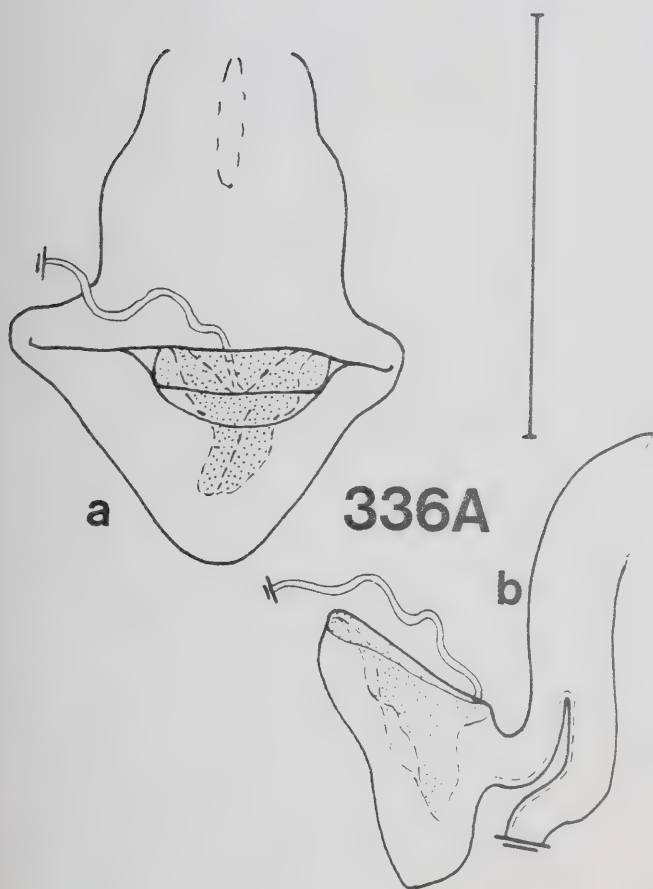
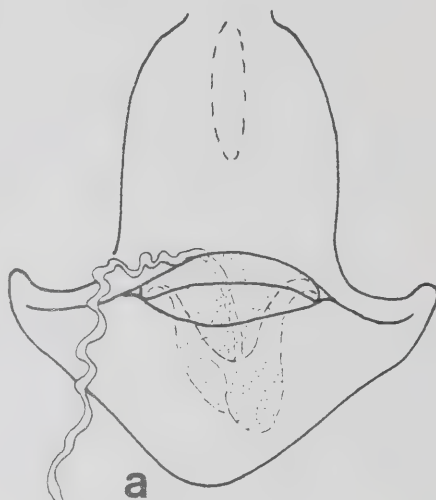
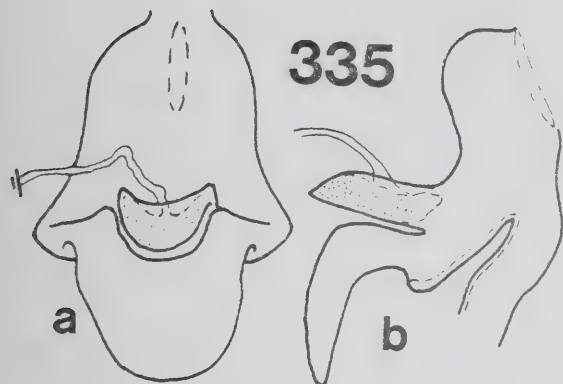
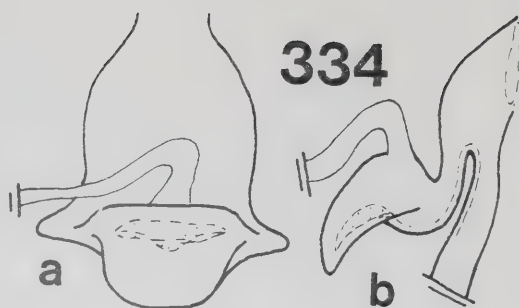
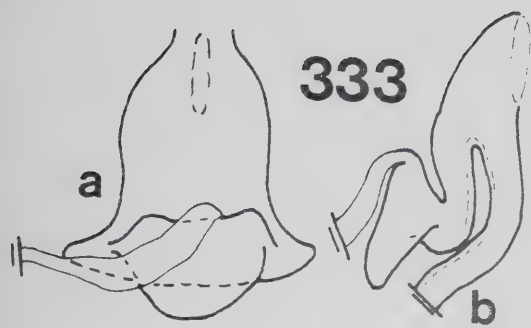
The first of these is the fact that the bird is not a sparrow, as it is too large and has a different shape. It is a member of the family *Corvidae*, which includes crows, ravens, and magpies. The second is that it is not a crow, as it has a different color and shape. It is a member of the genus *Corvus*, which includes crows and ravens. The third is that it is not a raven, as it is too small and has a different shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The fourth is that it is not a magpie, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The fifth is that it is not a crow, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The sixth is that it is not a raven, as it is too small and has a different shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The seventh is that it is not a magpie, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The eighth is that it is not a crow, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The ninth is that it is not a raven, as it is too small and has a different shape. It is a member of the species *Corvus corax*, which includes crows and ravens. The tenth is that it is not a magpie, as it has a different color and shape. It is a member of the species *Corvus corax*, which includes crows and ravens.

Figs. 331-332. Bursa copulatrix; ([a] ventral aspect; [b] left lateral aspect; [c] and [d] bursal sclerite enlarged, varied in aspect); stippled areas denote shape and location of distinct sclerites or moderately to markedly sclerotized, but less clearly defined, areas.

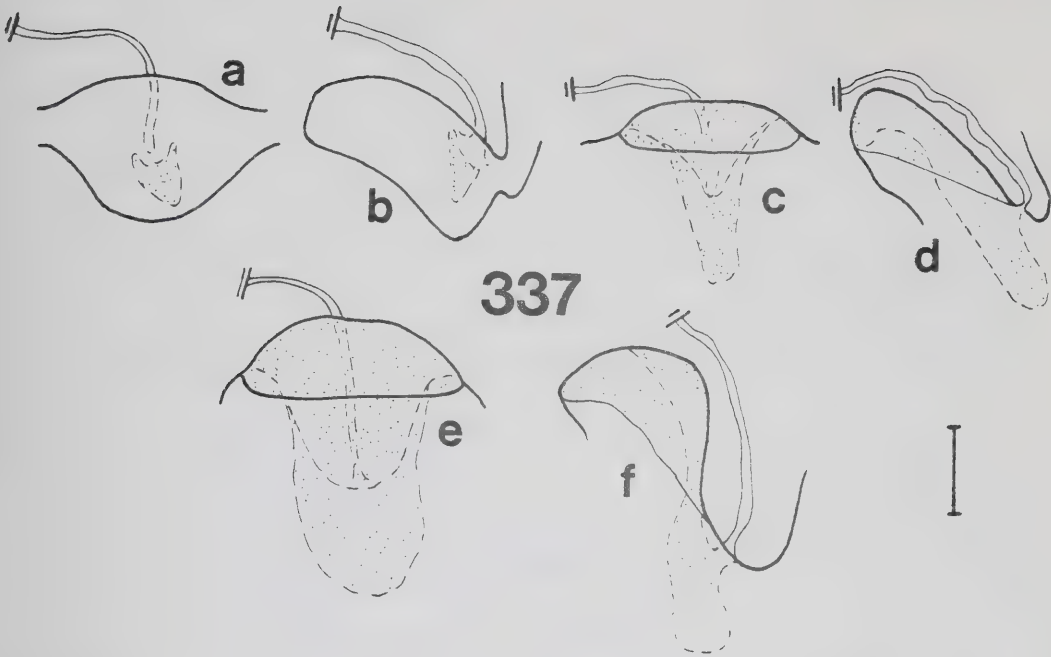
331. Nebria arkansana edwardsi new subspecies (Amiskwi Falls, British Columbia), ([c] sclerite enlarged, dorsal aspect; [d] sclerite enlarged, left lateral aspect). 332. Nebria arkansana oowah new subspecies (La Sal Mountains, Utah), ([c] sclerite enlarged, dorsal aspect; [d] sclerite enlarged, left lateral aspect). Scale line for [a]'s and [b]'s = 1.0 mm; scale line for [c]'s and [d]'s = 0.10 mm.



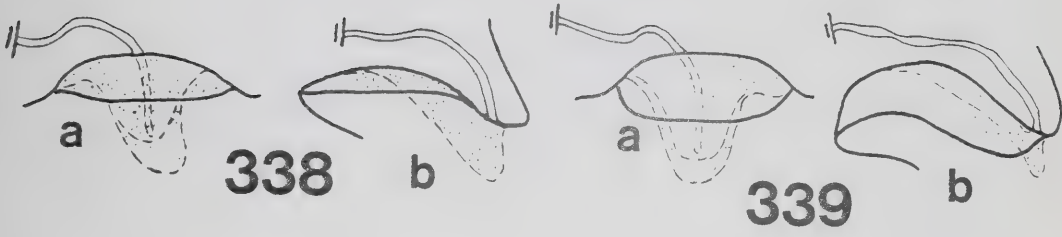
Figs. 333-336A. Bursa copulatrix; ([a] ventral aspect; [b] left lateral aspect); stippled areas denote shape and location of distinct sclerites or moderately to markedly sclerotized, but less clearly defined, areas. 333. Nebria gebleri gebleri Dejean (Waterton Park, Alberta). 334. Nebria gebleri strawberriensis new subspecies (Strawberry Mountains, Oregon). 335. Nebria kincaidi kincaidi Schwarz (Olympic Hot Springs, Washington). 336. Nebria coloradensis Van Dyke (Tarryall Creek, Colorado). 336A. Nebria piute Ball and Erwin (Circleville Mountain, Utah). Scale line for [a]'s and [b]'s = 1.0 mm; scale line for [c]'s and [d]'s = 0.10 mm.



Figs. 337-339. Spermathecal chamber of bursa copulatrix, enlarged, aspect varied; scale line = 0.10 mm. 337. Nebria trifaria trifaria LeConte ([a] dorsal aspect and [b] left lateral aspect, Ward, Colorado; [c] dorsal aspect and [d] left lateral aspect, Logan River, Utah; [e] dorsal aspect and [f] left lateral aspect, Bluebell Knoll, Utah). 338. Nebria trifaria catenata Casey (Wolf Creek Pass, Colorado), ([a] dorsal aspect; [b] left lateral aspect). 339. Nebria trifaria utahensis new subspecies (Henry Mountains, Utah) ([a] dorsal aspect; [b] left lateral aspect). Figs. 340-341. Bursa copulatrix. 340. Nebria paradisi Darlington (Mount Rainier, Washington), ([a] ventral aspect; [b] left lateral aspect). 341. Nebria darlingtoni new species (Riverton, California), ventral aspect). Scale line = 1.0 mm. [In Figs. 337-341, stippled areas denote shape and location of distinct sclerites or moderately to markedly sclerotized, but less clearly defined, areas].



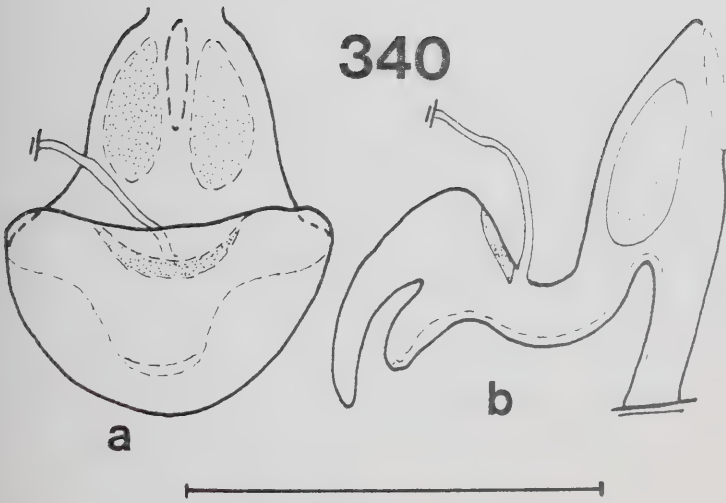
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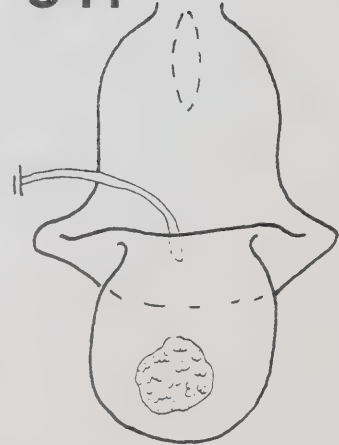
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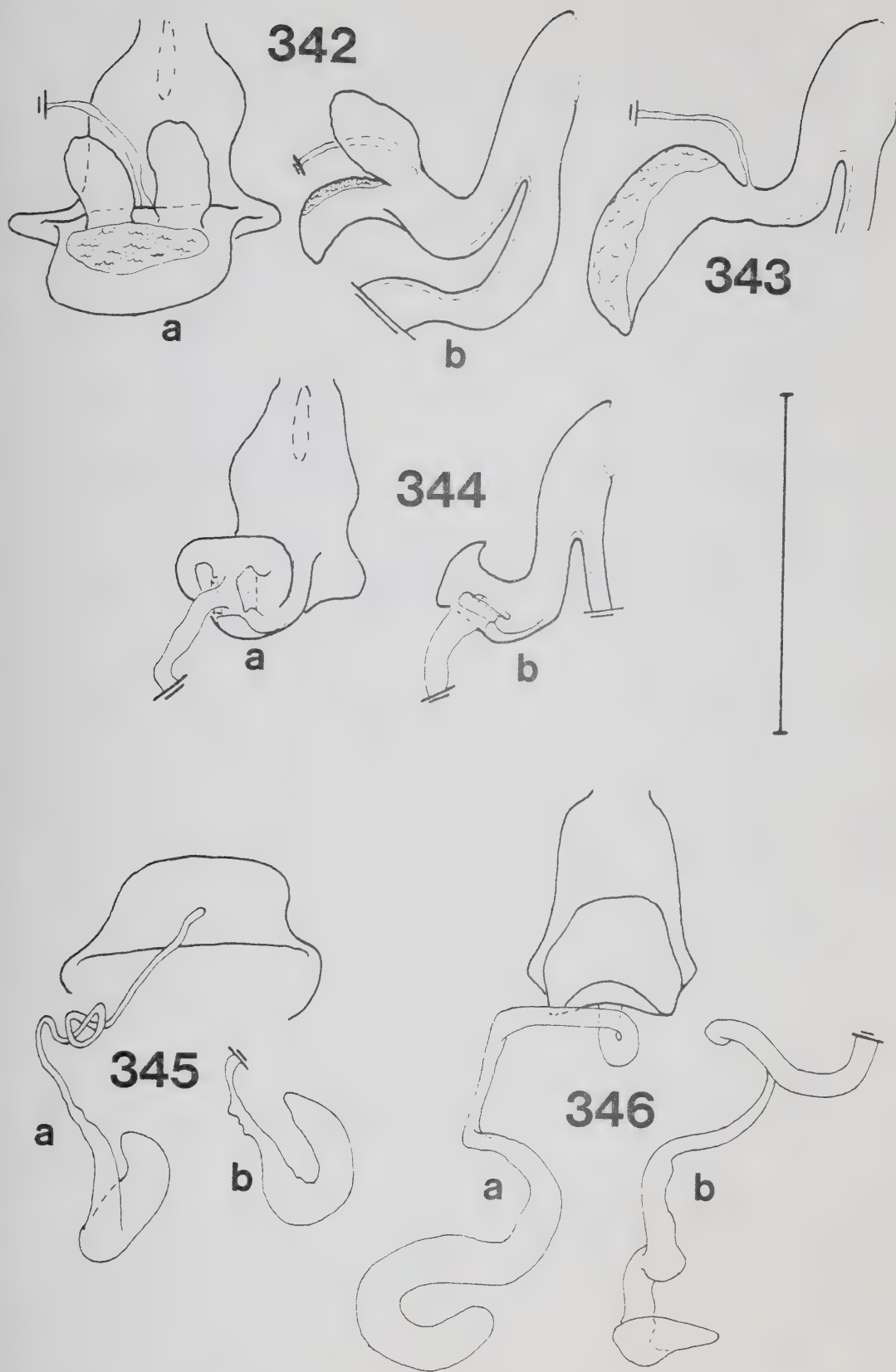
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Figs. 342-344. Bursa copulatrix; stippled areas denote shape and location of distinct sclerites or moderately to markedly sclerotized, but less clearly defined, areas. 342. Nebria desolata Kavanaugh (11 miles southeast of Boulder, Utah), ([a] ventral aspect; [b] left lateral aspect). 343. Nebria obliqua LeConte (Athabasca River, Alberta), left lateral aspect. 344. Nebria nivalis nivalis (Paykull) (Cold Bay, Alaska), ([a] ventral aspect; [b] left lateral aspect).

Figs. 345-346. Spermatheca and spermathecal duct. 345. Nebria virescens Horn (Vancouver, British Columbia), ([a] dorsal aspect; [b] left lateral aspect). 346. Nebria hudsonica LeConte (Hoback Junction, Wyoming), ([a] dorsal aspect; [b] left lateral aspect). Scale line = 1.0 mm.





Figs. 347-348. Spermatheca and spermathecal duct. 347. Nebria frigida Sahlberg (Eagle Summit, Alaska), ([a] dorsal aspect; [b] left lateral aspect). 348. Nebria subdilatata Motschulsky (Yakutskaya Oblast, U.S.S.R.), ([a] dorsal aspect; [b] left lateral aspect). Fig. 349. Spermatheca, bursa copulatrix, and associated structures, Notiophilus borealis Harris (Nome, Alaska), ([a] dorsal aspect; [b] left lateral aspect). Figs. 350-351. Spermatheca and spermathecal duct, dorsal aspect. 350. Nebria piperi Van Dyke (Mount Rainier, Washington). 351. Nebria pallipes Say (Bolton, Vermont). Scale line = 1.0 mm.

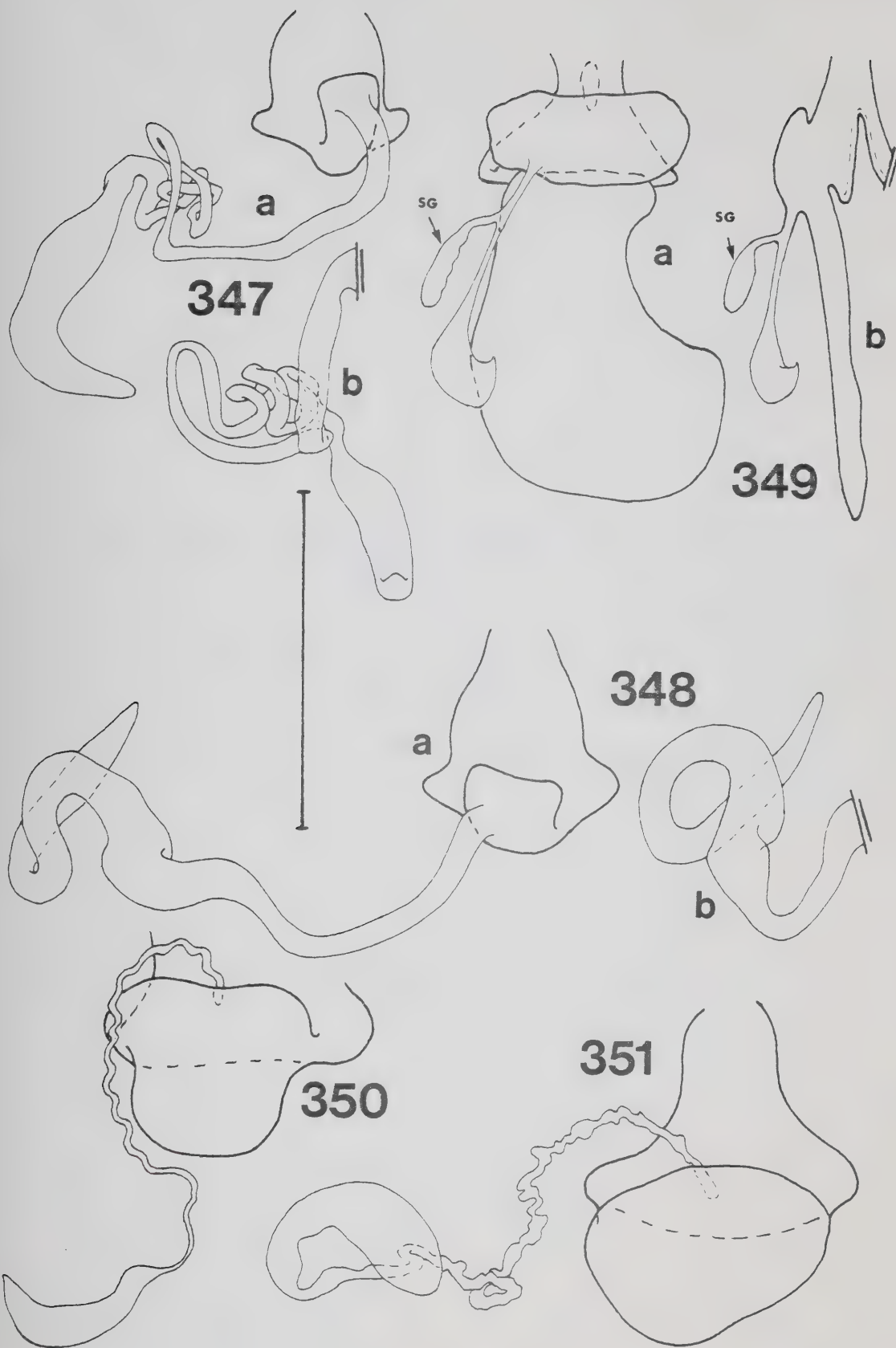
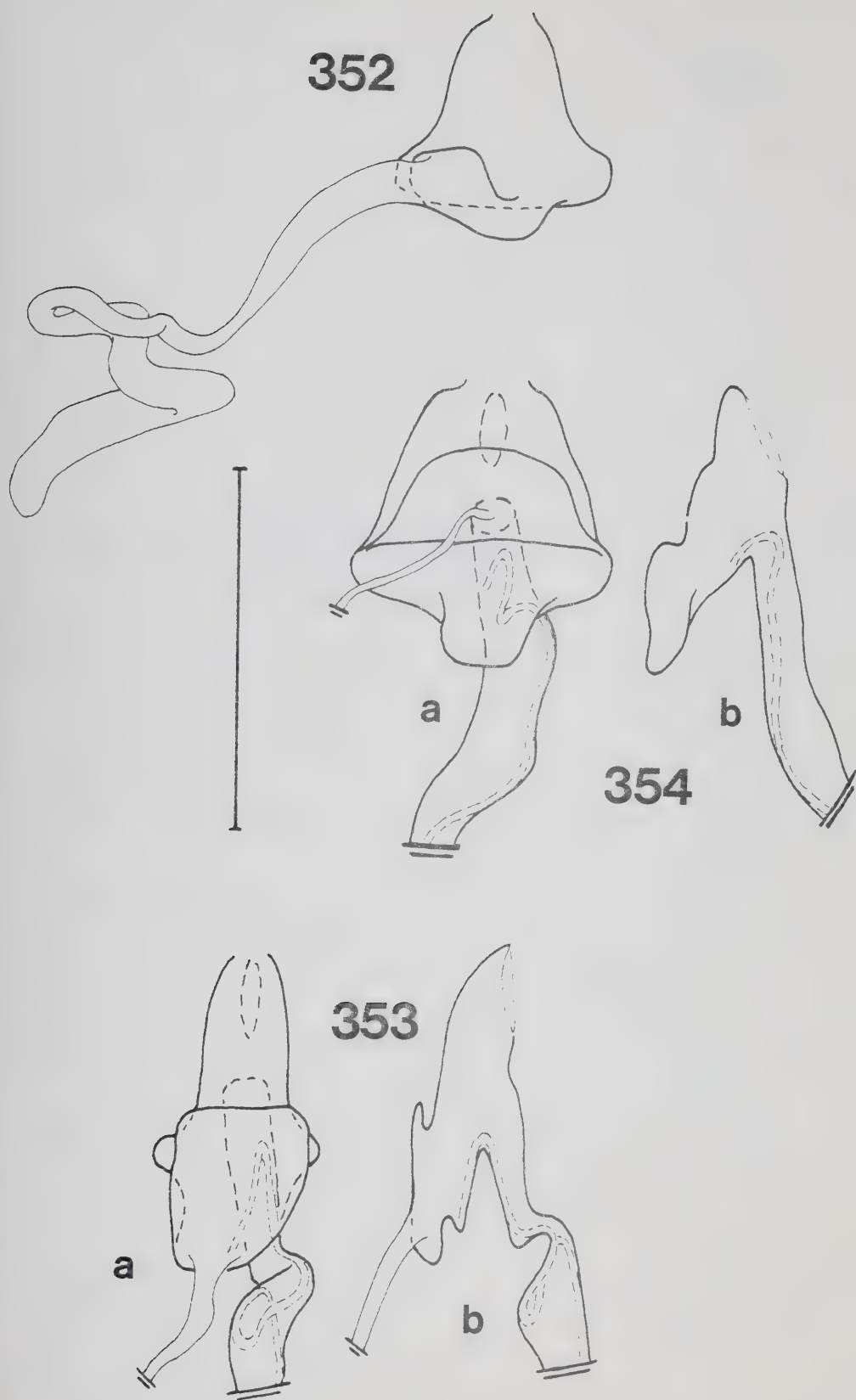
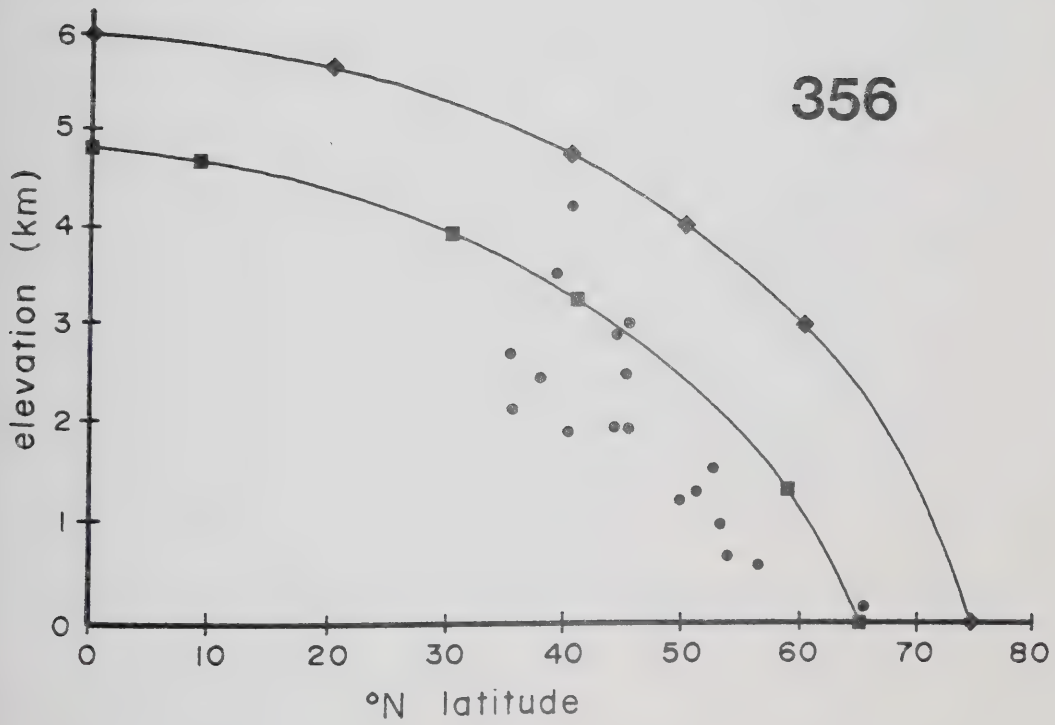
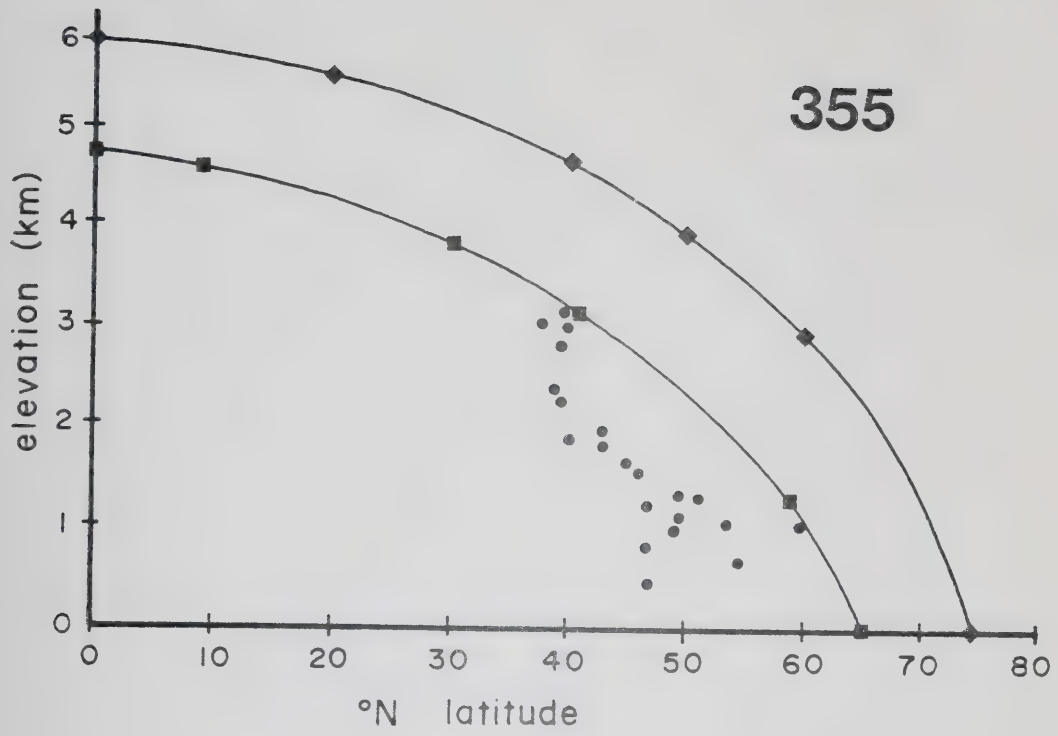


Fig. 352. Spermatheca and spermathecal duct, dorsal aspect, Nebria
crassicornis intermedia Van Dyke (Logan Pass, Montana). Figs.
353-354. Bursa copulatrix and common oviduct, ([a] dorsal aspect; [b]
left lateral aspect). 353. Nebria brevicollis (Fabricius) (Aviemore,
Scotland). 354. Nebria virescens Horn (Vancouver, British Columbia).
Scale line = 1.0 mm.





Figs. 355-356. Altitude and latitude components of distribution; curve through squares = 10° C isotherm for mean annual air temperature (approximates treeline); curve through diamonds = 0° C isotherm for mean annual air temperature (approximates line of permanent snow); isotherm data from Mani, 1962 and 1968. 355. Nebria hudsonica LeConte. 356. Nebria gyllenhali (Schönherr).





Figs. 357-358. Altitude and latitude components of distribution; curve through squares = 10° C isotherm for mean annual air temperature (approximates treeline); curve through diamonds = 0° C isotherm for mean annual air temperature (approximates line of permanent snow); isotherm data from Mani, 1962 and 1968. 357. Nebria obliqua LeConte. 358. Nebria purpurata LeConte.

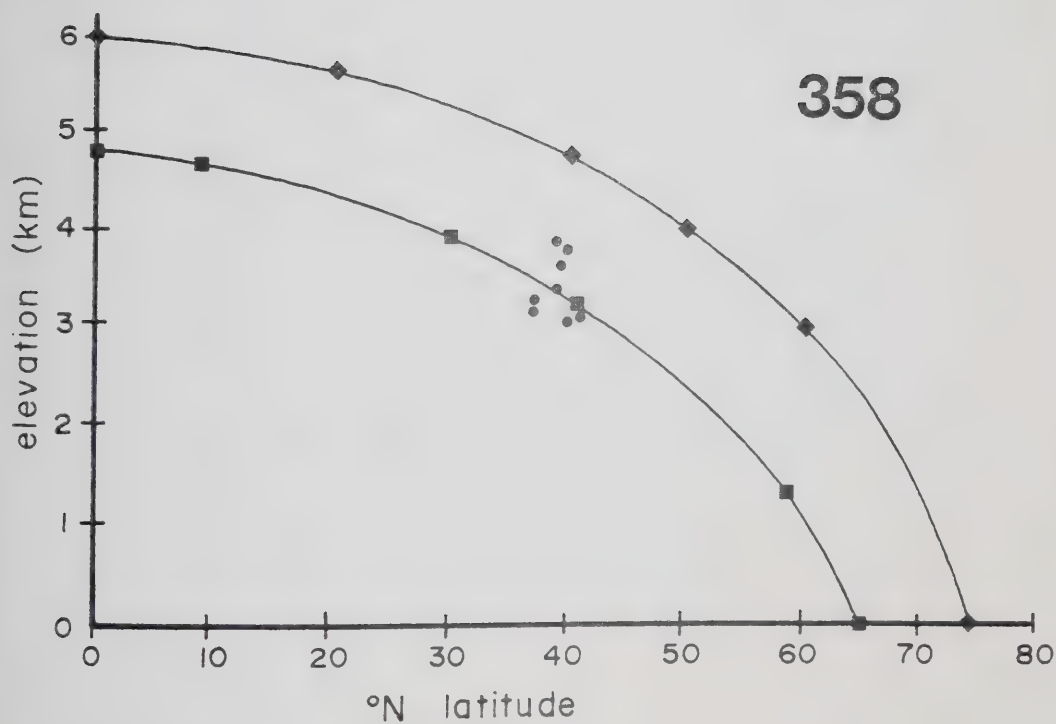
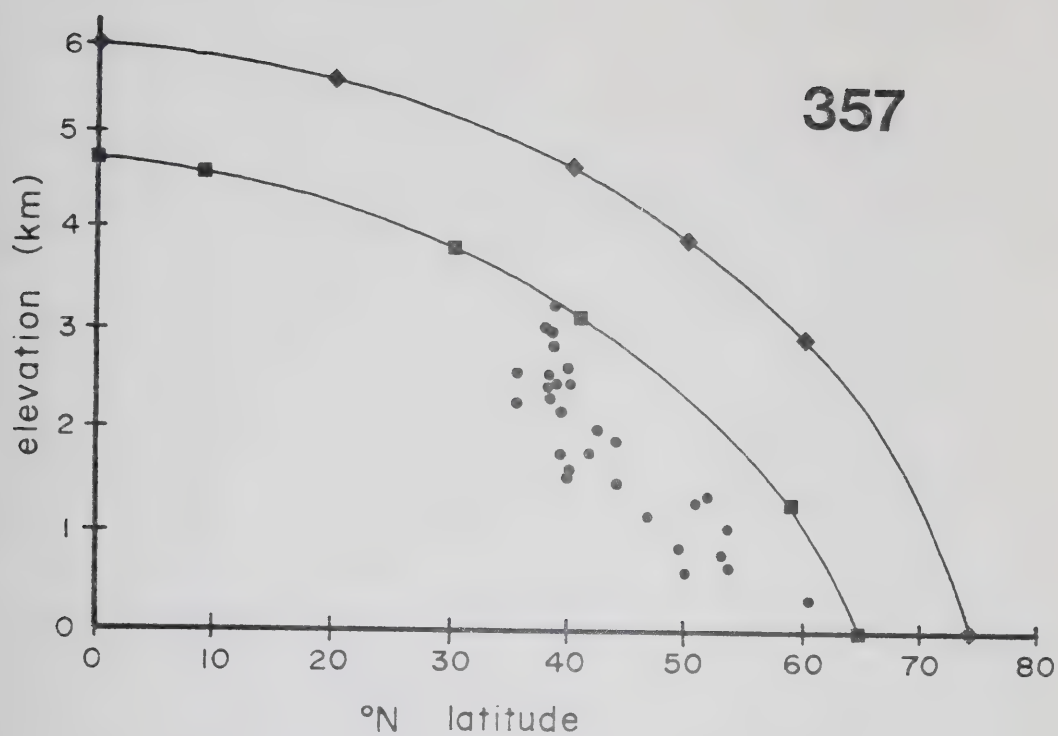


Fig. 359. Relationship between proximity to water and altitude among Nebria, Front Range, Colorado; diamonds = Nebria obliqua LeConte; squares = Nebria hudsonica LeConte; circles = Nebria gyllenhali lindrothi new subspecies; lines connecting symbols denote range of distances from stream at which individuals were found at a given altitude; arrows indicate that individuals were also found at distances greater than 2.0 m from stream.

359

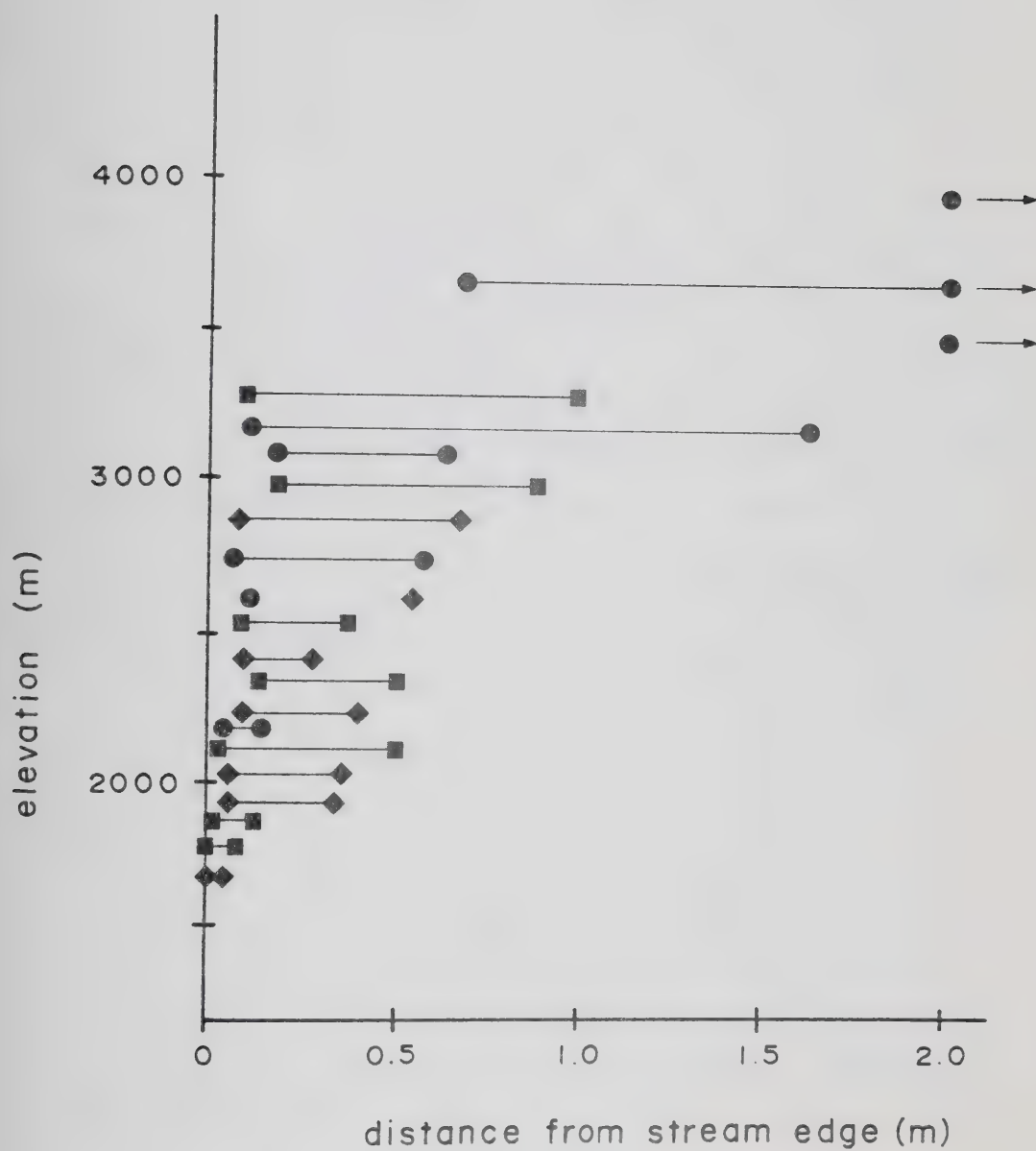
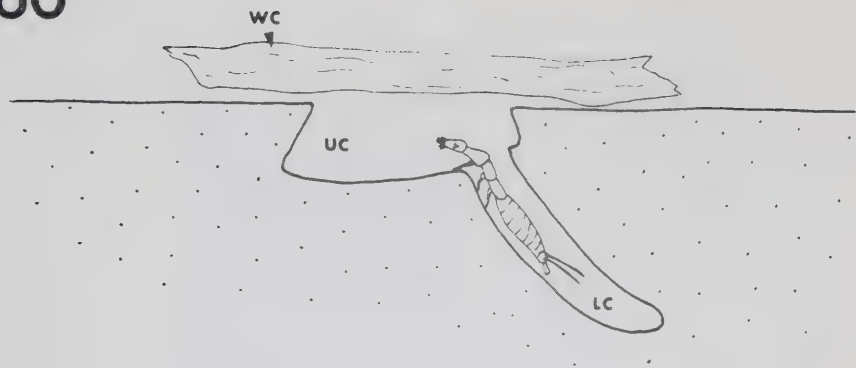




Fig. 360. Cell of Nebria diversa LeConte larva (see text for discussion); LC = lower chamber; UC = upper chamber; WC = wood chip.

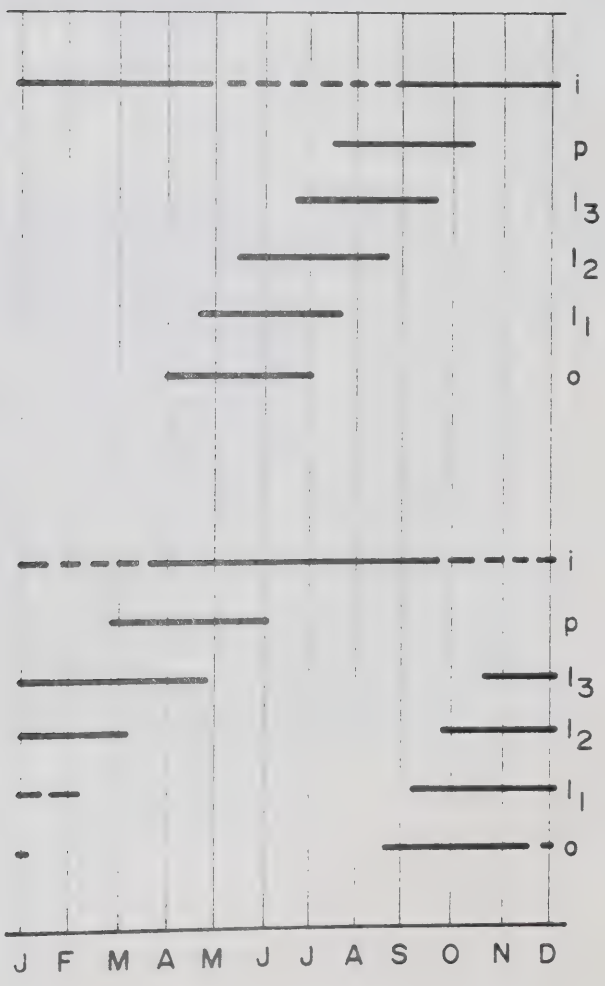
Fig. 361. Life cycle timing, schematic representation; solid lines denote temporal limits to frequent occurrence of individuals at a given stage of development; dashed lines denote infrequent occurrence; i = adult stage; p = pupal stage; l_1 , l_2 , and l_3 = first, second and third larval stages, respectively; o = egg stage (see text for discussion).

360



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OVERWINTERING



LARVAL
OVERWINTERING

Fig. 362. Thoracic venter, Nebria eschscholtzii Ménériés (Rogue River, Oregon), bearing mites [scanning electron micrograph by G. Braybrook]. Scale: 1.0 cm = .250 mm. Fig. 363. Histiosoma maritimus (Oudemans) (Acarina: Anoetidae) immature on the above N. eschscholtzii specimen [mite identification by R. O. Schuster; scanning electron micrograph by G. Braybrook]. Scale: 1.0 cm = 70 .



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Fig. 364. Floating posture, Nebria piperi Van Dyke, ([a] dorsal aspect, [b] left lateral aspect).

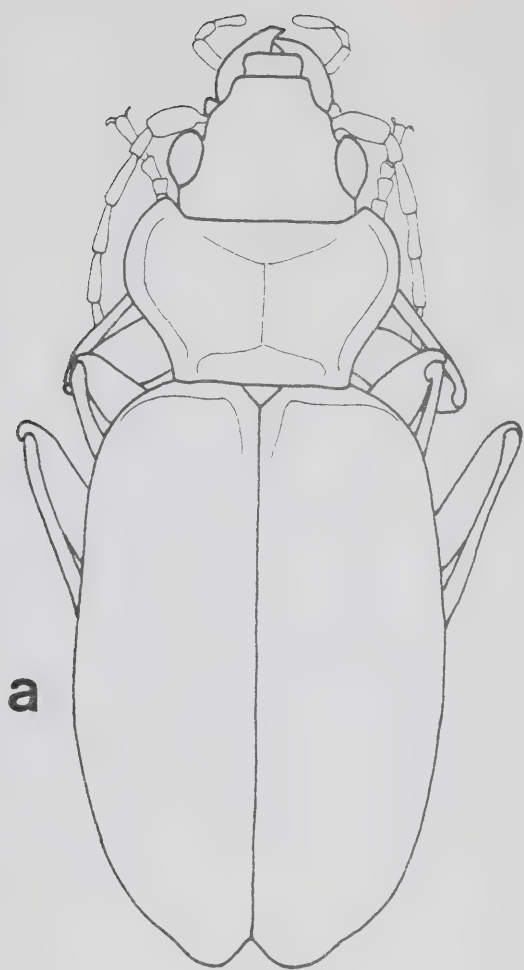
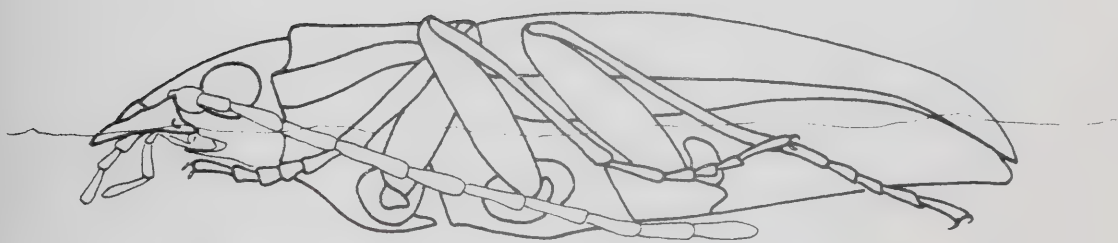
**a****364****b**



Fig. 365. Comparison in species group composition between Lindroth's (1961a) classification of Nearctic taxa and two proposed earlier. Names in quotation marks in boxes refer to an author's name for a species group; numbers in parentheses in boxes refer to the number of species included by the author that are also recognized here as distinct species; lines connecting boxes indicate one or more species in common; numbers in parentheses associated with connecting lines indicate the number of species in common.

LeConte (1878)

Lindroth (1961a)

Casey (1913, 1920, 1924)

[species groups]

[species groups]

[species groups]

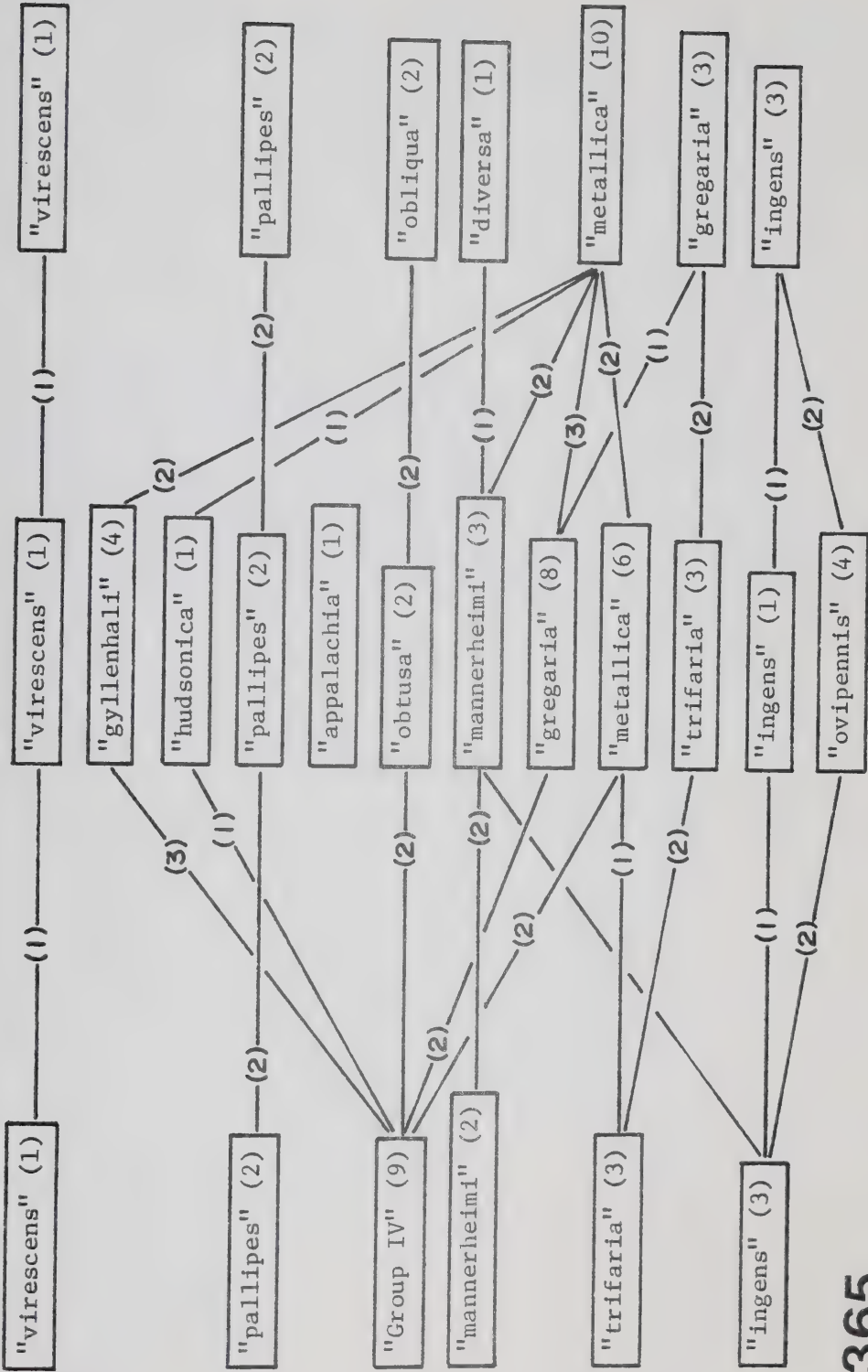




Fig. 366. Comparison in species group composition between Lindroth's (1961a) classification of Nearctic taxa and three proposed later (including that proposed here). Names in quotation marks in boxes refer to an author's name for a species group; numbers in parentheses in boxes refer to the number of species included by the author that are also recognized here as distinct species; lines connecting boxes indicate one or more species in common; numbers in parentheses associated with connecting lines indicate the number of species in common.

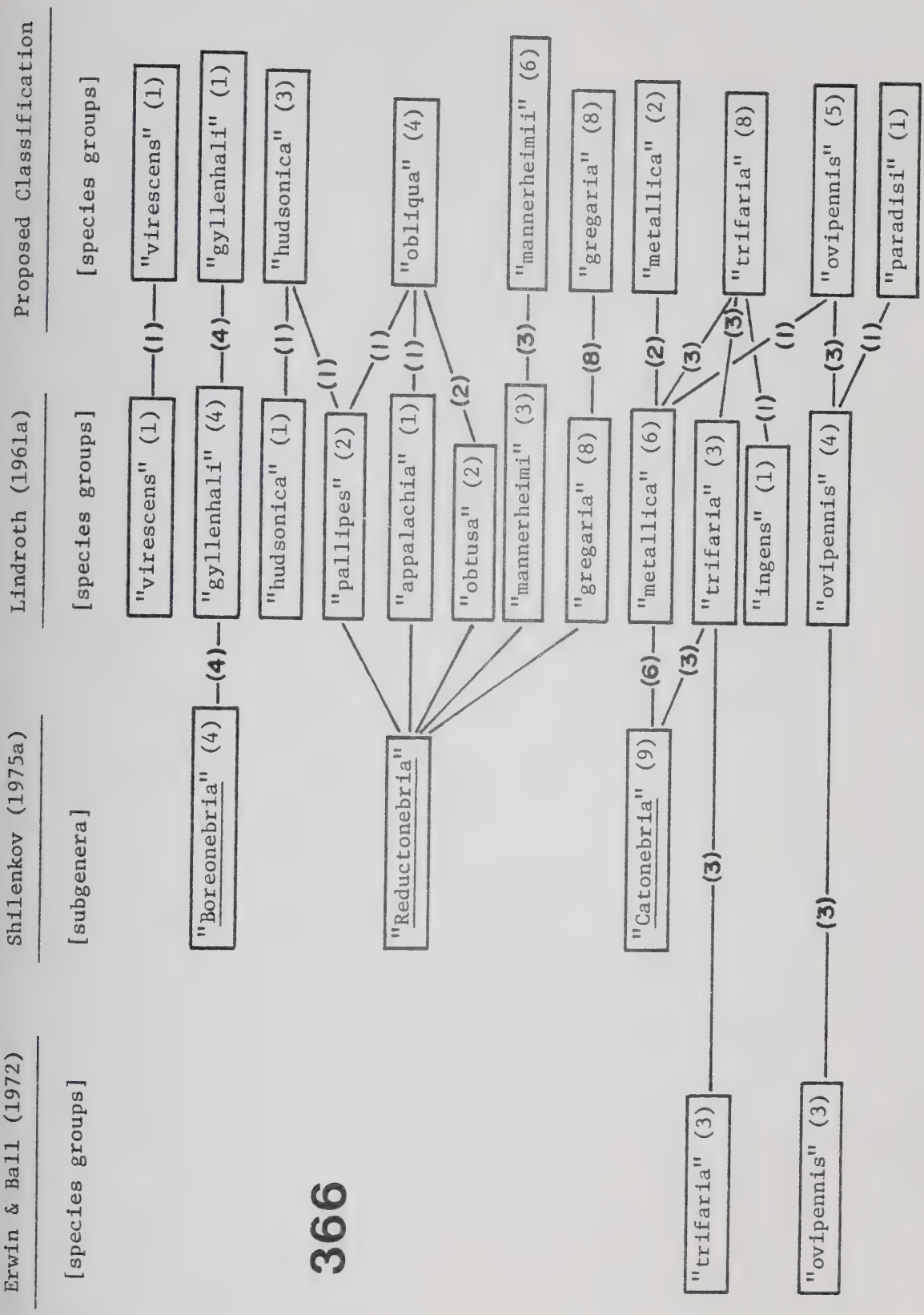
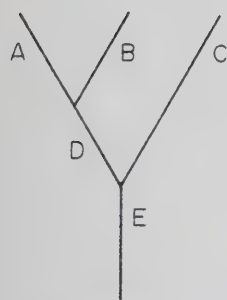


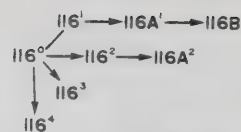
Fig. 367. Sample cladogram reflecting relationships among extant taxa, A, B, and C; D and E represent hypothetical common ancestors.

Fig. 368. Hypothetical reconstruction of evolutionary sequence (transformation series) of character states of character no. 116, shape (lateral aspect) of the pre-apical shaft of the male median lobe (see Table 15 for explanation of code for character states). Fig.

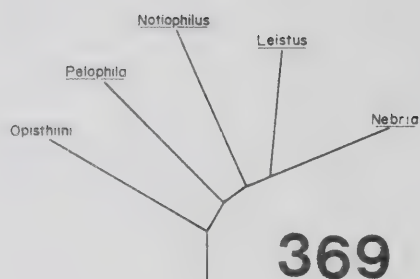
369. Cladogram illustrating the hypothetical set of phylogenetic relationships among Nebria and related genera used as the basis for "ex-group" comparisons in cladistic analysis. Fig. 370. An example of use of "character correlation" in cladistic analysis. A. Circles on lines indicate distribution of character state(s) determined, with relatively high confidence, to be apotypic [representation in members of taxa A and B has been observed, that in members of D is inferred]. B. and C. Circles on lines indicate distribution of a character state evolutionary status of which is uncertain [only representation in members of A and C has been observed; alternatives for representation in D and E are inferred]. Fig. 371. Illustration of a hypothetical evolutionary sequence, including an initial pattern of geographical (clinal) variation, followed by two cycles of range fractionation which result (eventually) in speciation; vertical double bars denote geographical barriers; underlining brackets group populations considered conspecific.



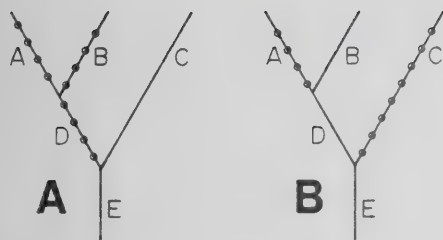
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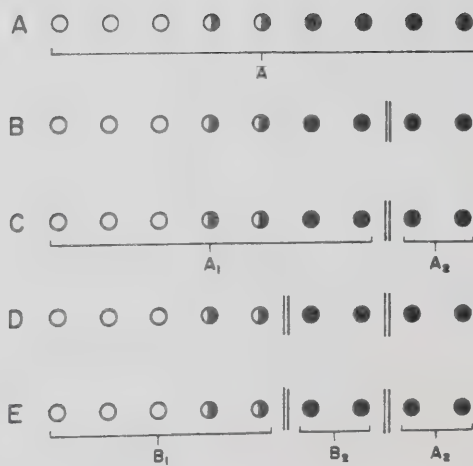
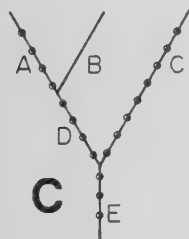
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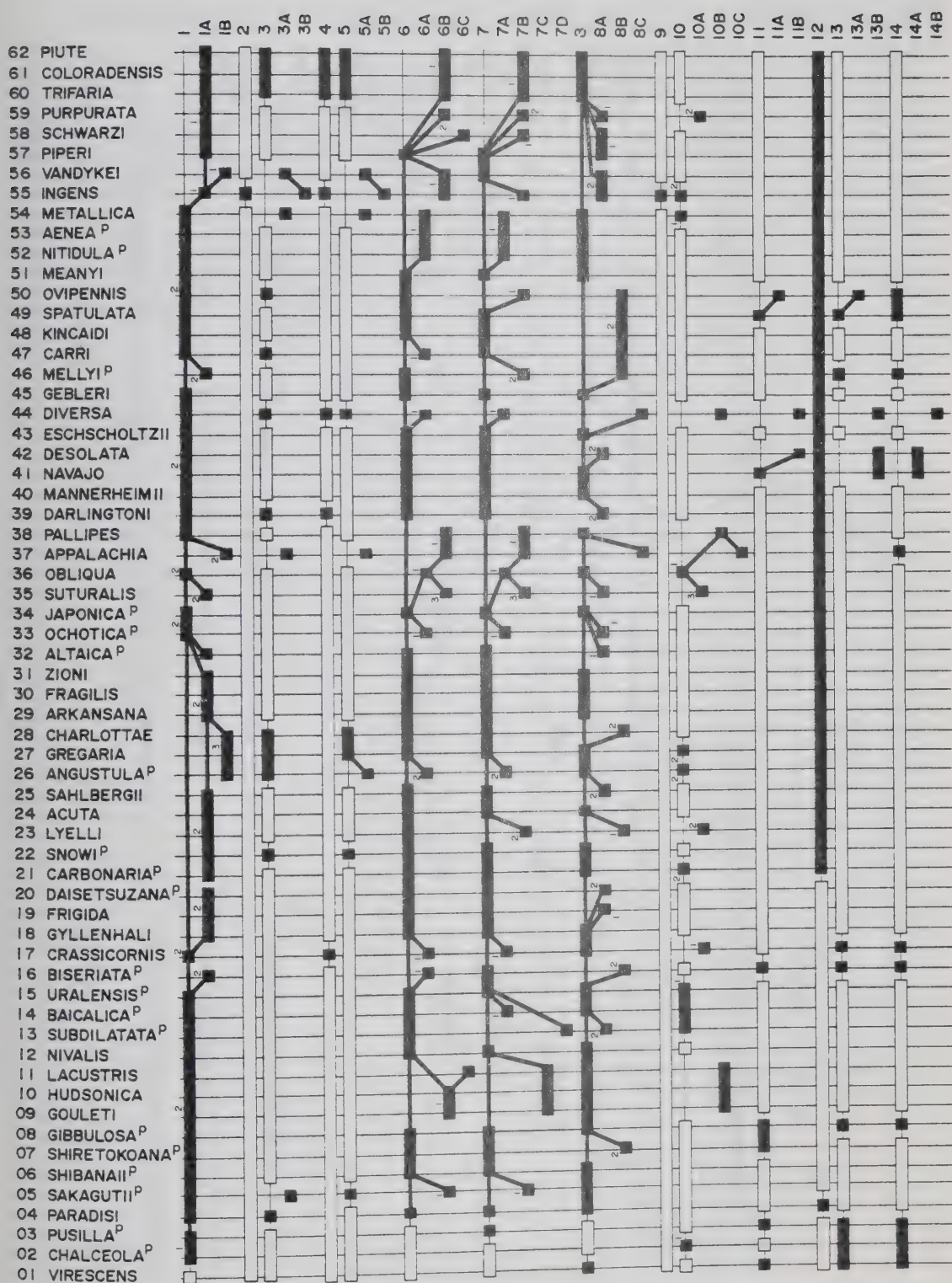
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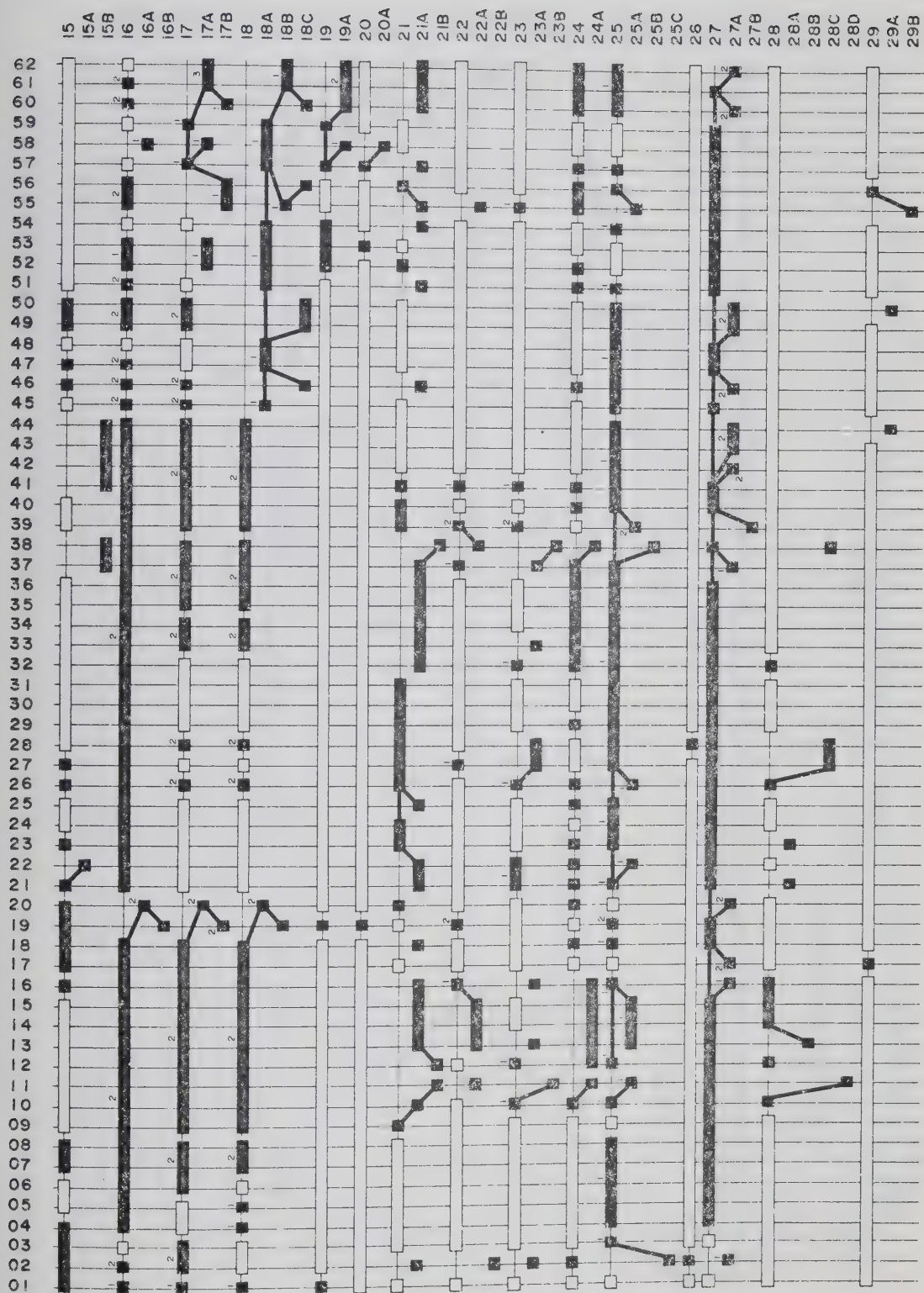
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Fig. 372. Distribution of character states among Nearctic Nebria species and their Palaearctic relatives (designated by superscript "p"). This figure is presented in lieu of a narrative report on character state distributions; and it is to be used in concert with Tables 14 and 15, the latter of which explains the alpha-numeric code used here for characters and character states. Reference to the figure and tables should permit the reader to retrieve data on single taxa or groups of same, or on given characters or distributions of given character states. Various characters for which the only apotypic states represented are those autapotypic for members of single species have been omitted from both figure and tables. Black rectangles indicate representation of states interpreted as apotypic; white rectangles denote pleisiotypic states. Where apotypic states are shared AND this synapotypy is interpreted as due to inheritance from a common ancestor, a continuous black rectangle appears, linking columns for species concerned. Further evolutionary modifications of primary apotypic character states (i.e. secondary, tertiary, etc. apotypic states) are presented on subsequent rows designated, sequentially, as A, B, C, etc. Rectangles representing all apotypic states interpreted as synapotypic at a primary level (i.e. derived from a common apotypic [but relatively pleisiotypic] state) are linked to rectangles representing the stem state by thick lines if they are in different rows (equivalent to continuous rectangles in the same row). Where two or more relatively apotypic states have developed from one relatively pleisiotypic state, each of the former is designated by a superscript number over appropriate rectangles. Question marks ("?",) denote state representations yet unknown.

372



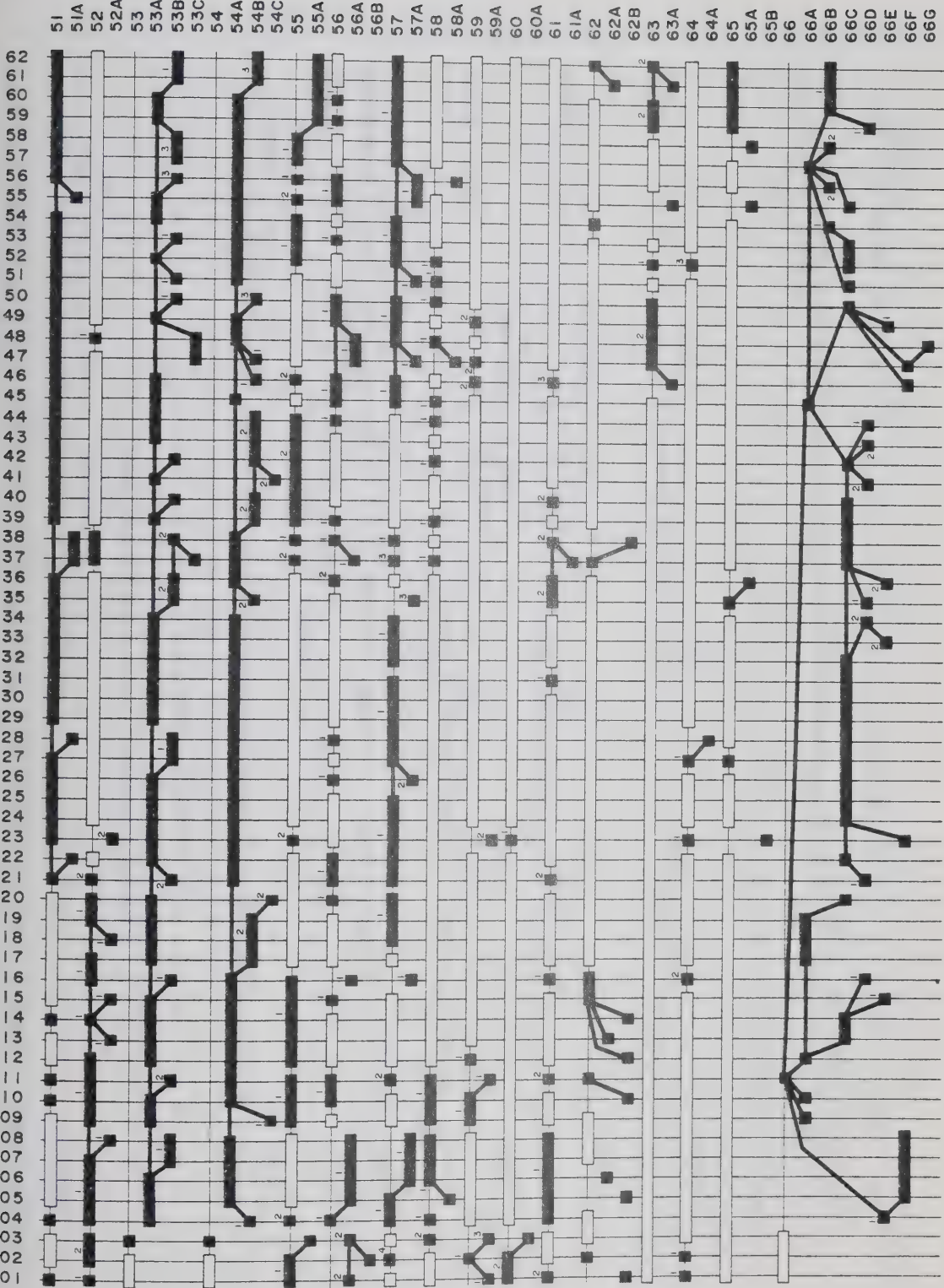
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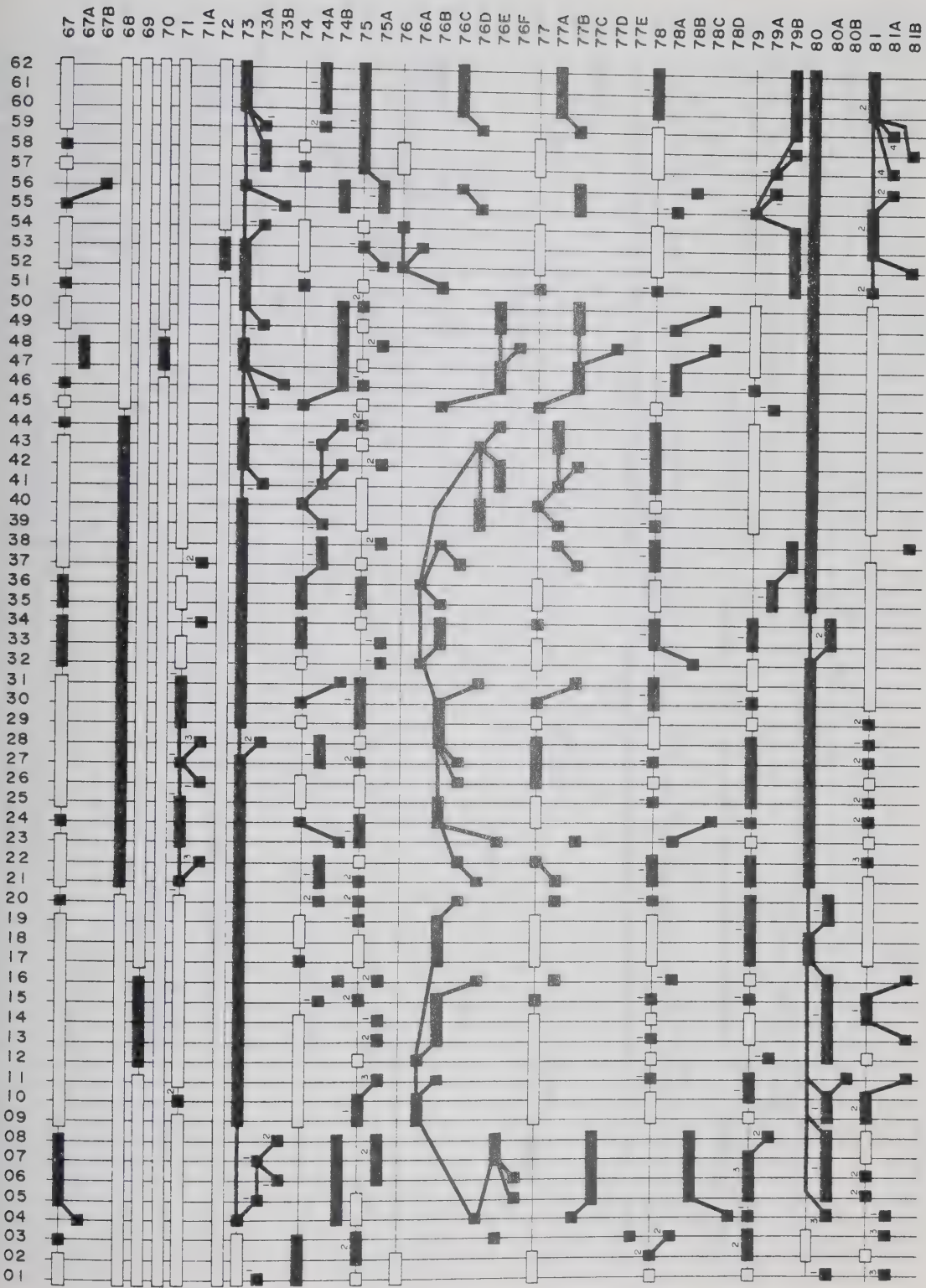
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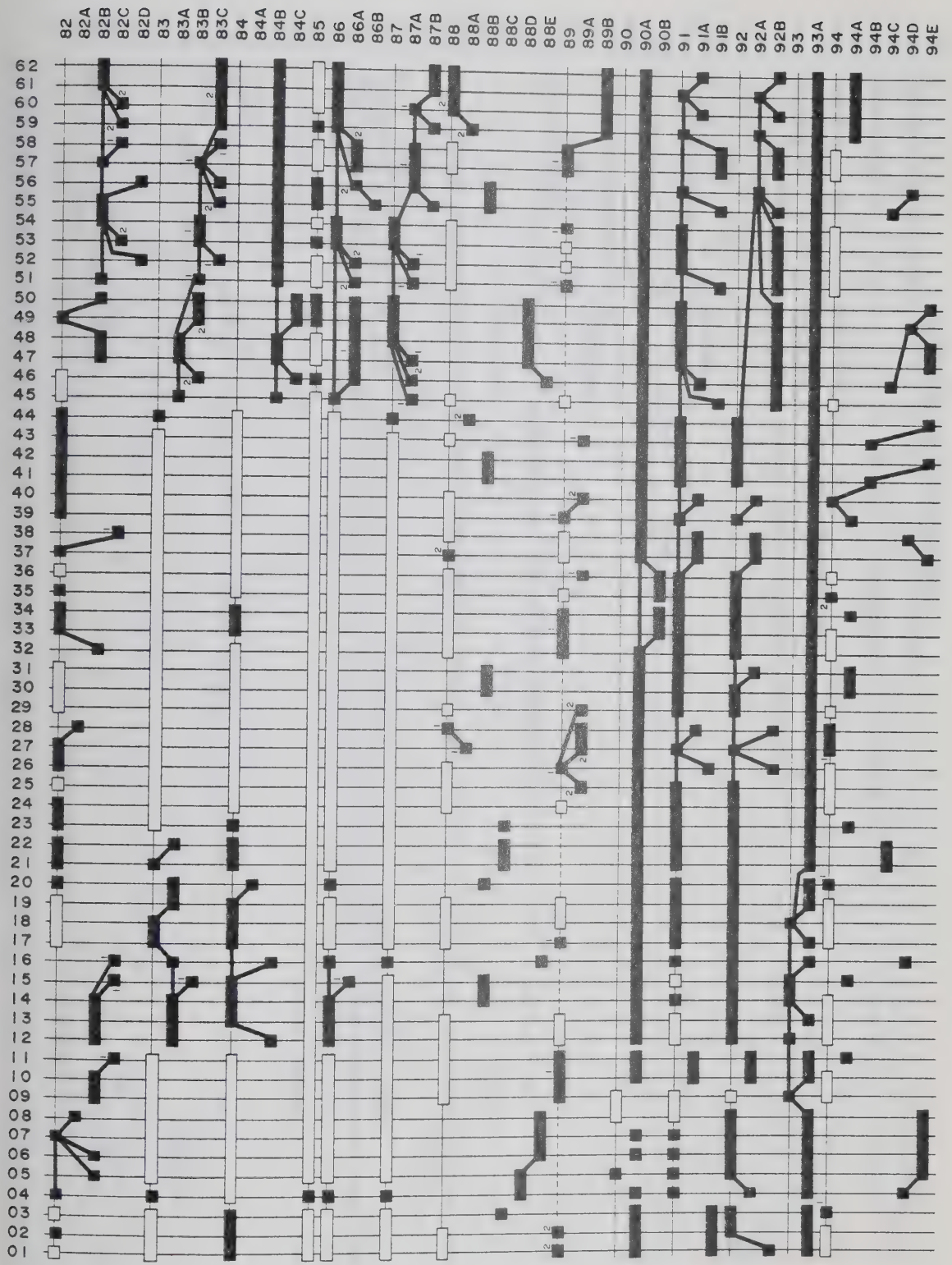
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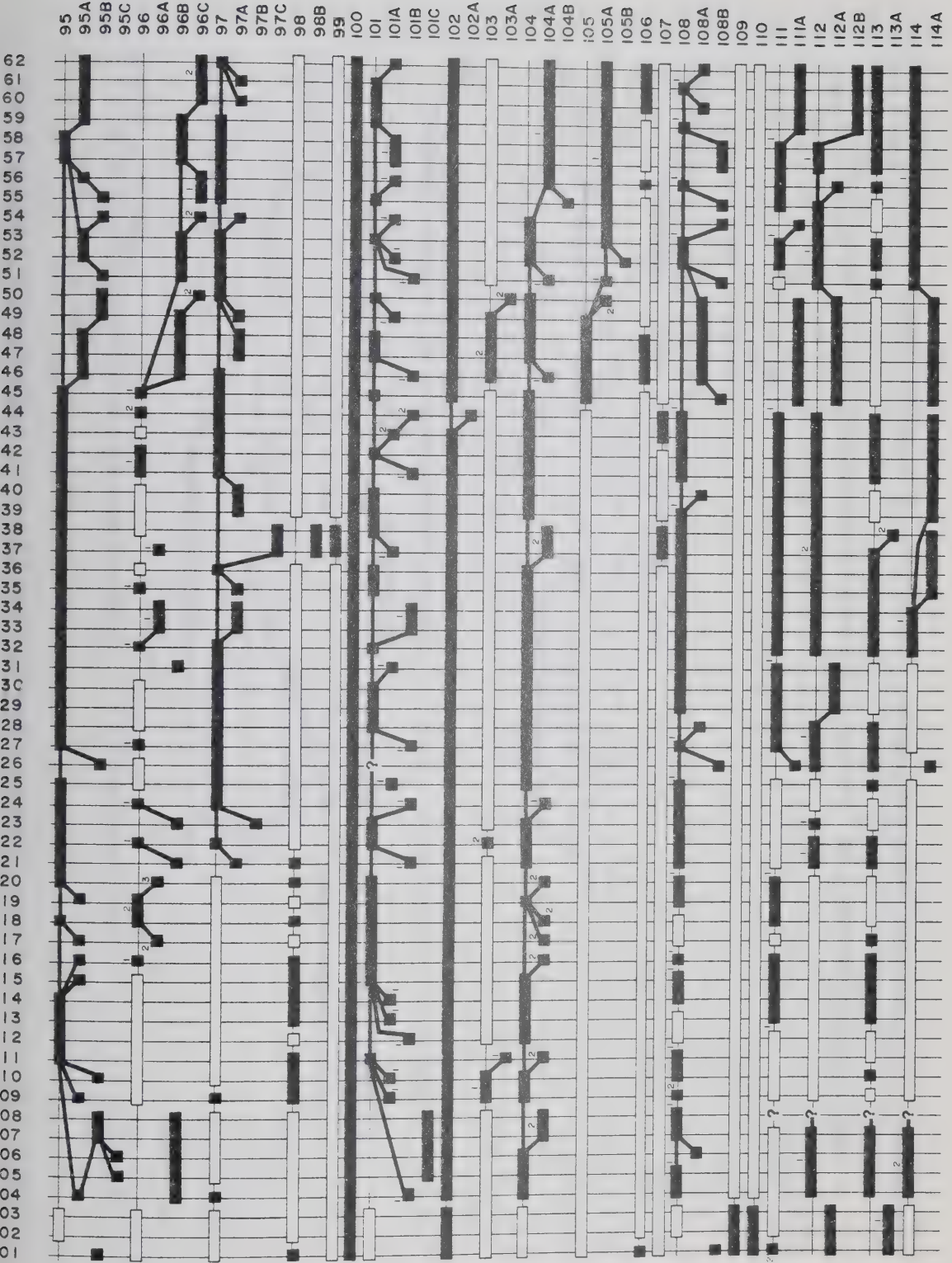
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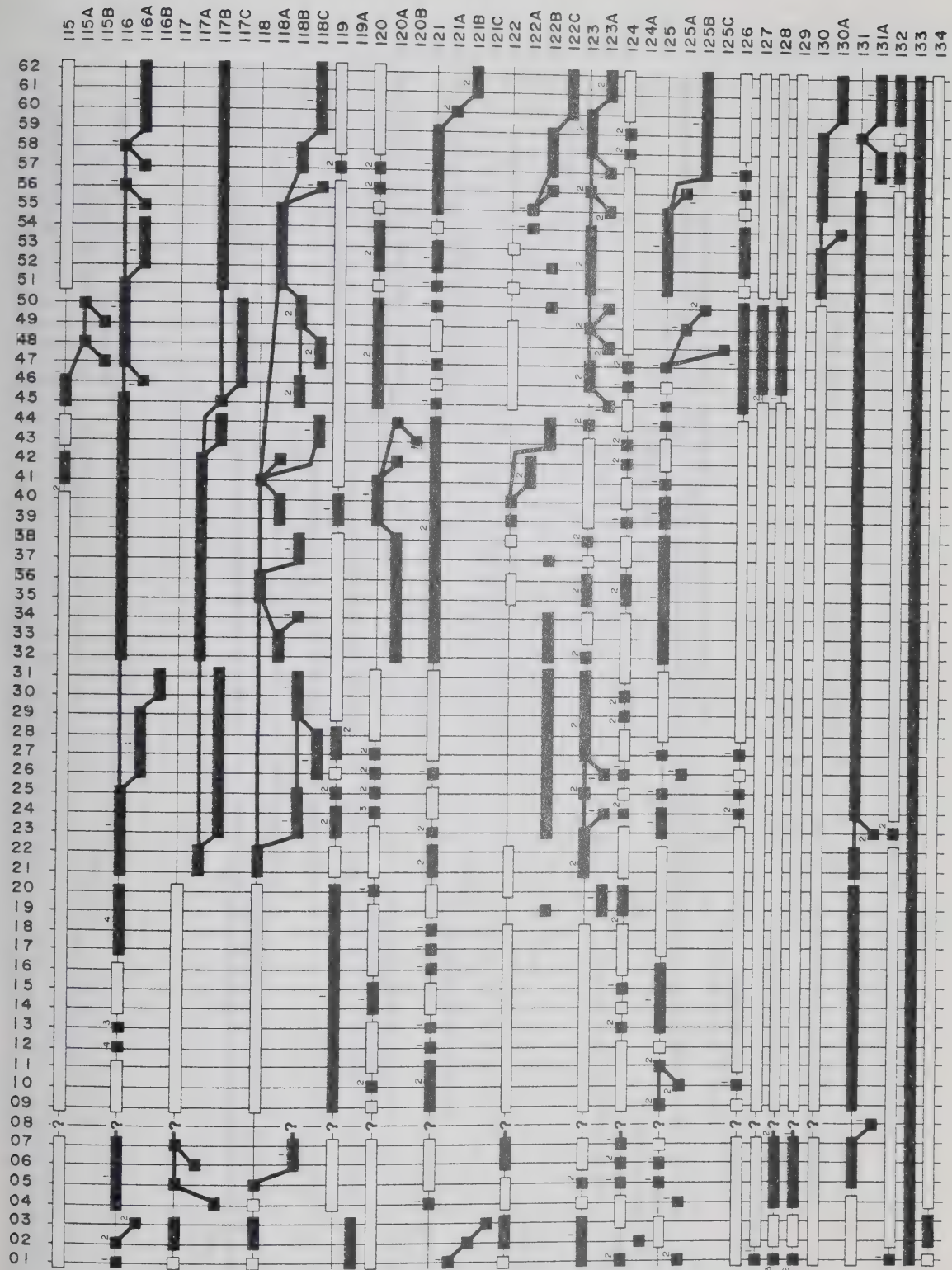
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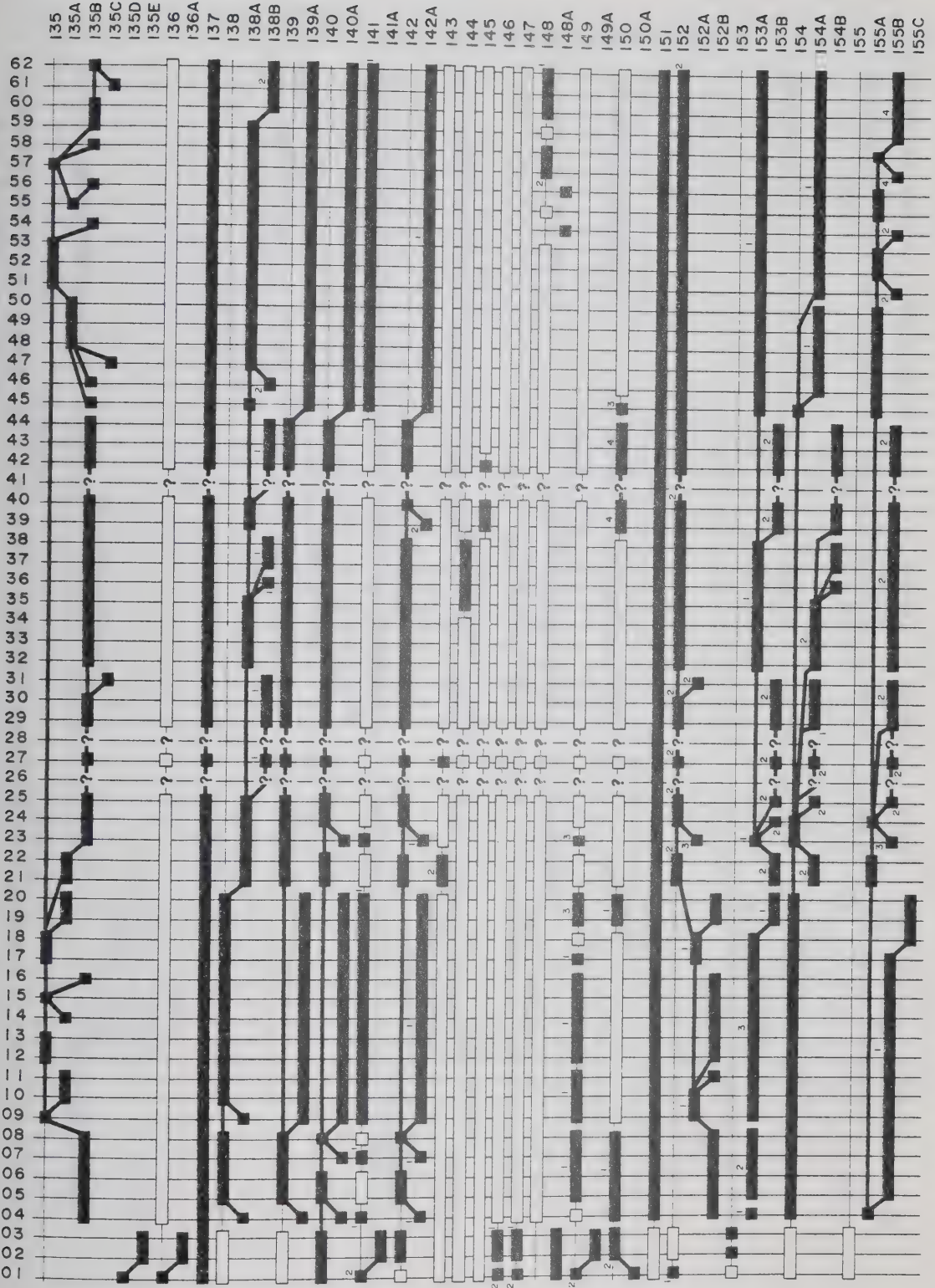
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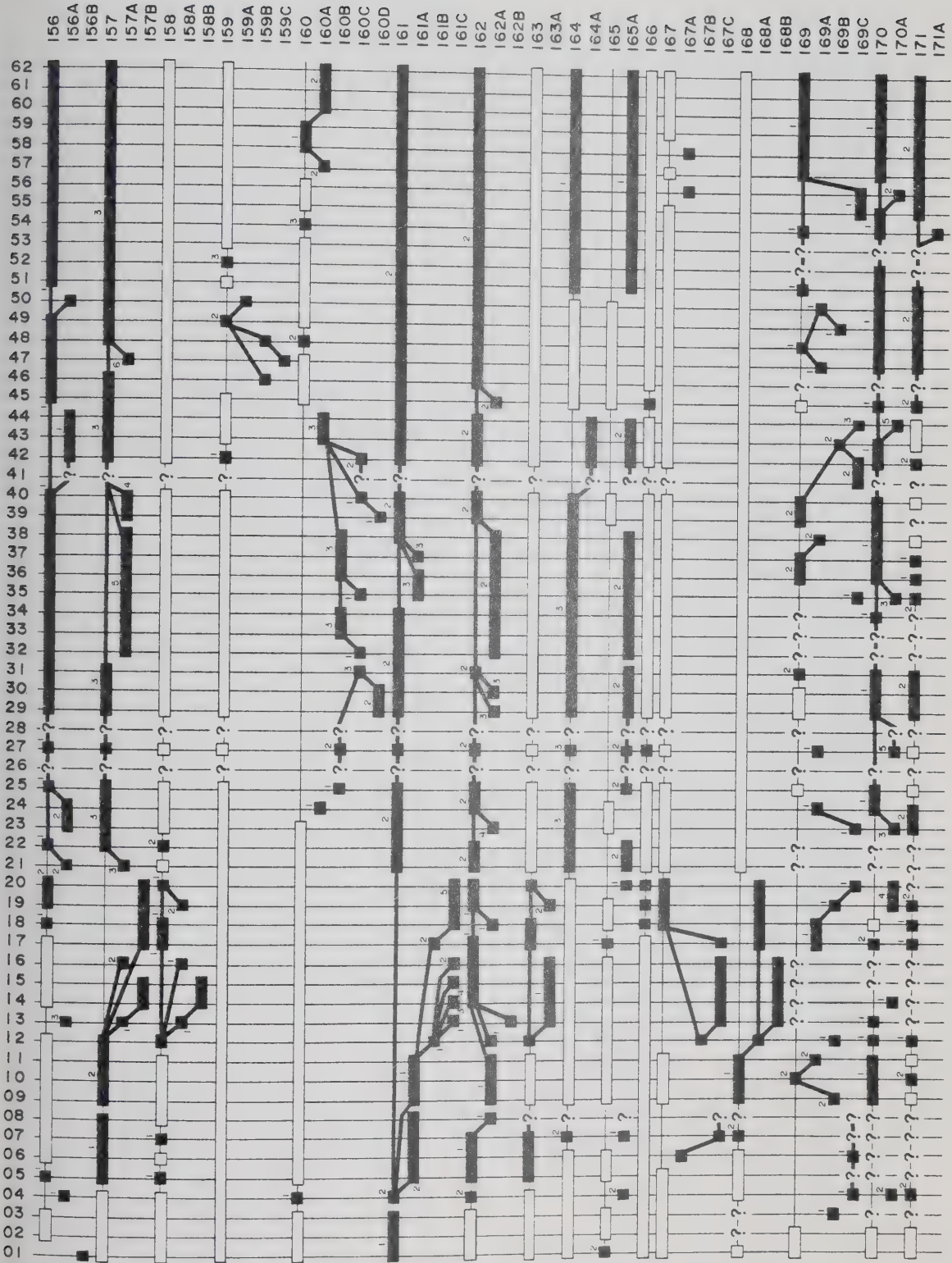


Fig. 373. Cladogram illustrating proposed phylogenetic relationships among Nearctic Nebria species and their Palaearctic relatives (names of the latter appear in brackets). Numbers beside solid dots on line segments denote the number of synapotypic character states shared by members of the monophyletic group including the hypothetical stem species (represented by the line segment) and all its descendant (extant) species.

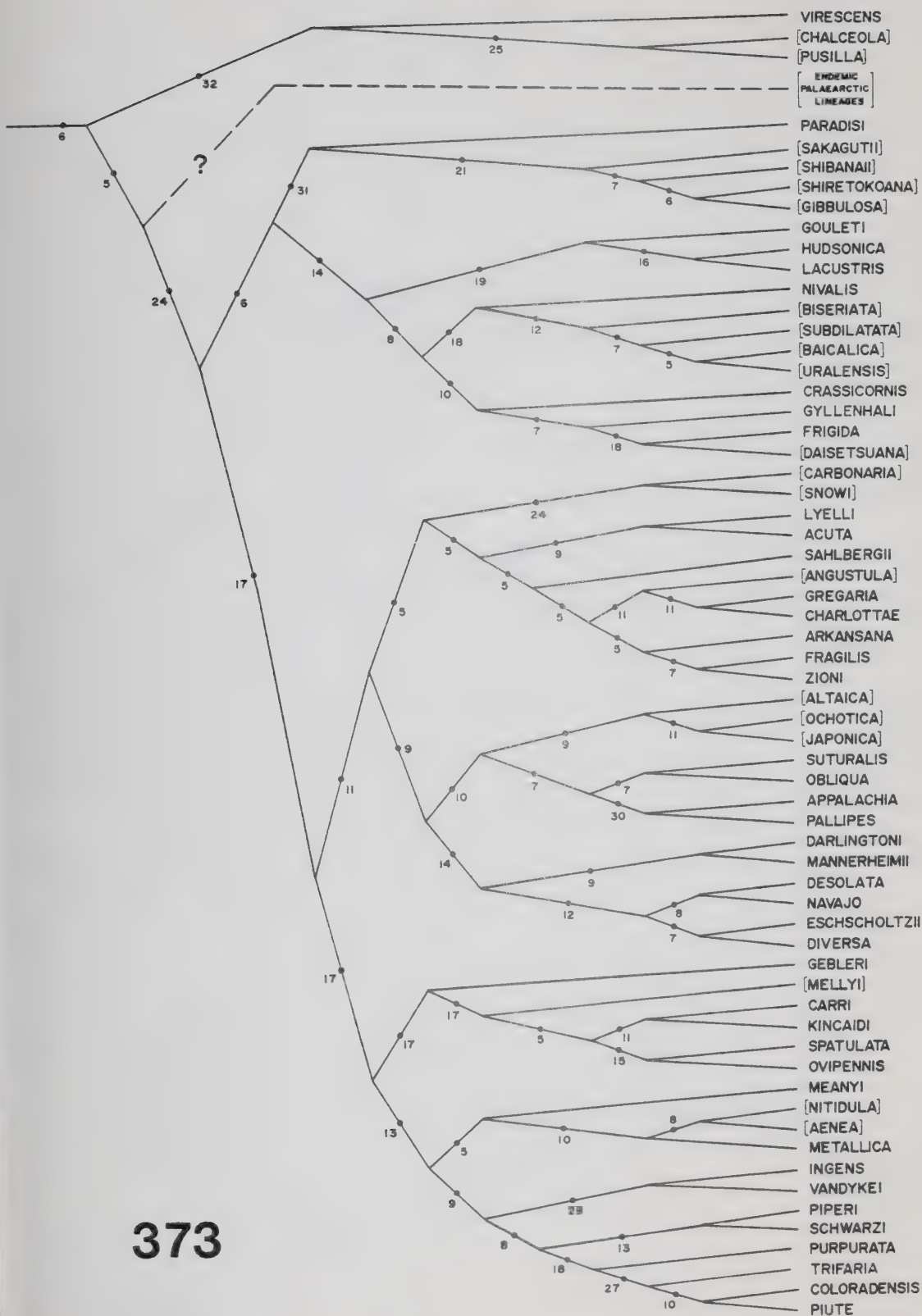
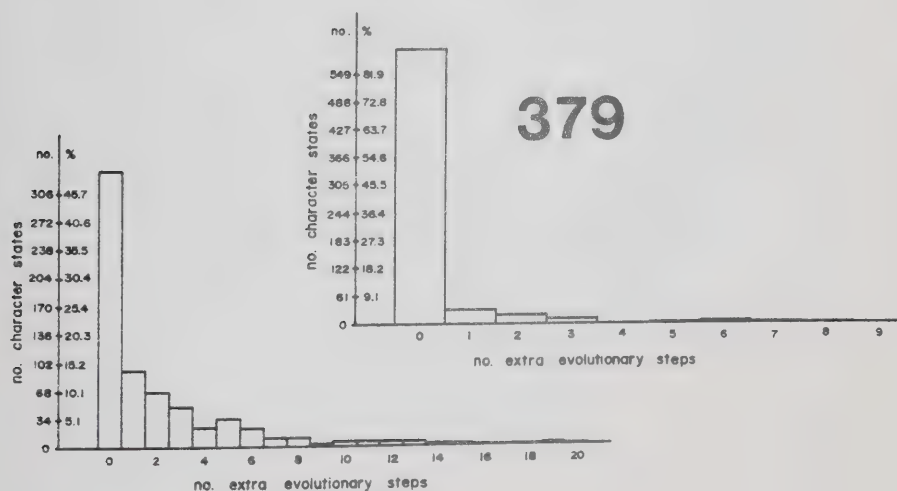
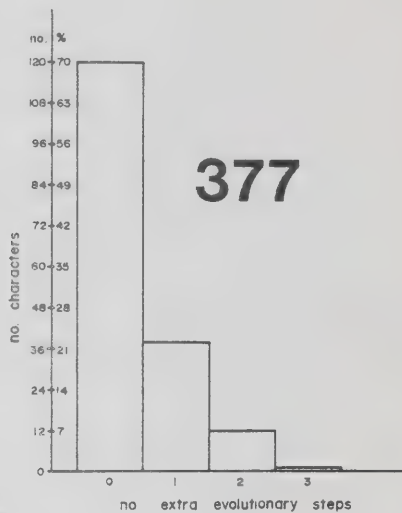
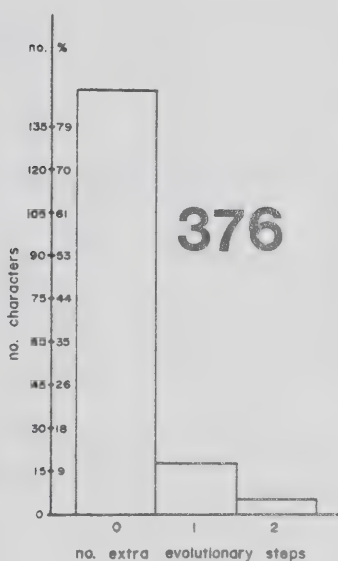
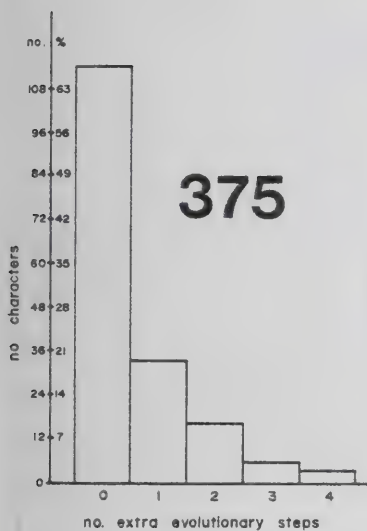


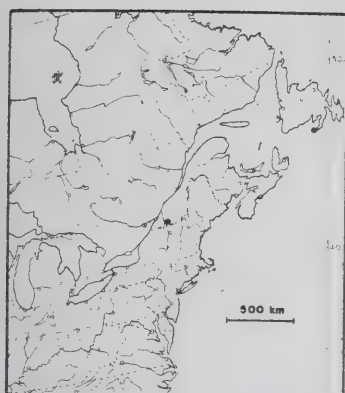
Fig. 374. Frequency distribution of characters in which a given total number of extra evolutionary steps (including both intrinsic and extrinsic steps) are required by the proposed phylogeny. Fig. 375. Frequency distribution of characters in which a given number of intrinsic extra evolutionary steps are required. Fig. 376. Frequency distribution of characters in which a given number of convergent, intrinsic steps are required. Fig. 377. Frequency distribution of characters in which a given number of reversed, intrinsic steps are required. Fig. 378. Frequency distribution of character states in which a given number of convergent, extrinsic steps are required by the proposed phylogeny. Fig. 379. Frequency distribution of character states in which a given number of reversed, extrinsic steps are required.



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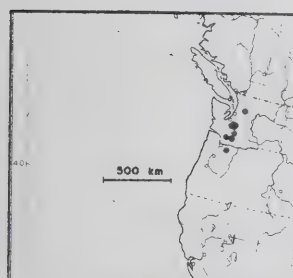
Figs. 380 - 384. Geographical distribution maps. 380. Nebria brevicollis (Fabricius). 381. Nebria virescens Horn. 382. Nebria paradisi Darlington. 383. Nebria gouleti new species. 384. Nebria hudsonica LeConte (solid circles), N. lacustris lacustris Casey (open circles), and N. lacustris bellorum new subspecies (solid triangles).



380



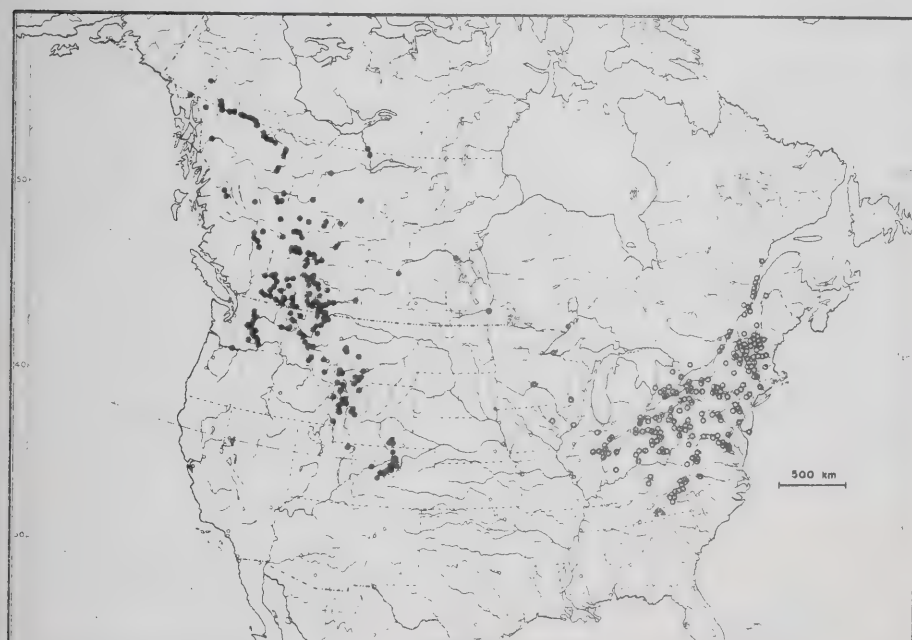
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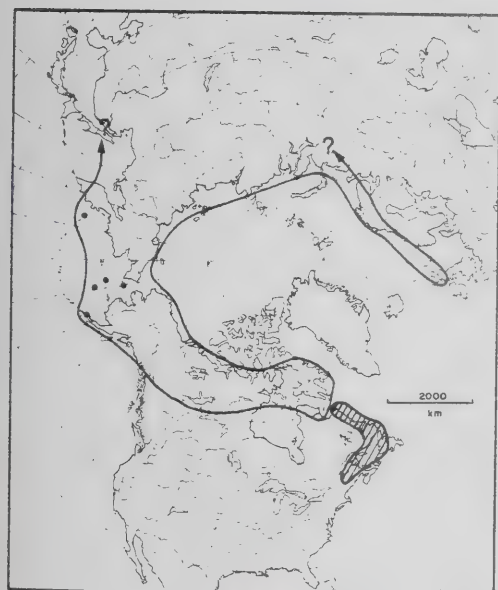
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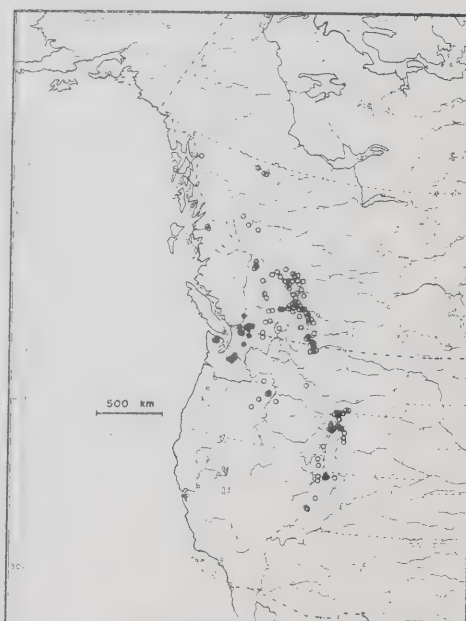
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Figs. 385 - 387. Geographical distribution maps. 385. Nebria
nivalis nivalis (Paykull) (solid circles) and N. nivalis gaspesiana
new subspecies (solid triangles); "X" denotes location of deposits
yeilding N. nivalis fossils. 386. Nebria nivalis nivalis (Paykull)
(open area; southern range limits in Asia unknown) and N. nivalis
gaspesiana new subspecies (cross-hatched area). 387. Nebria
crassicornis crassicornis Van Dyke (solid circles) and N. crassicornis
intermedia Van Dyke (open circles).

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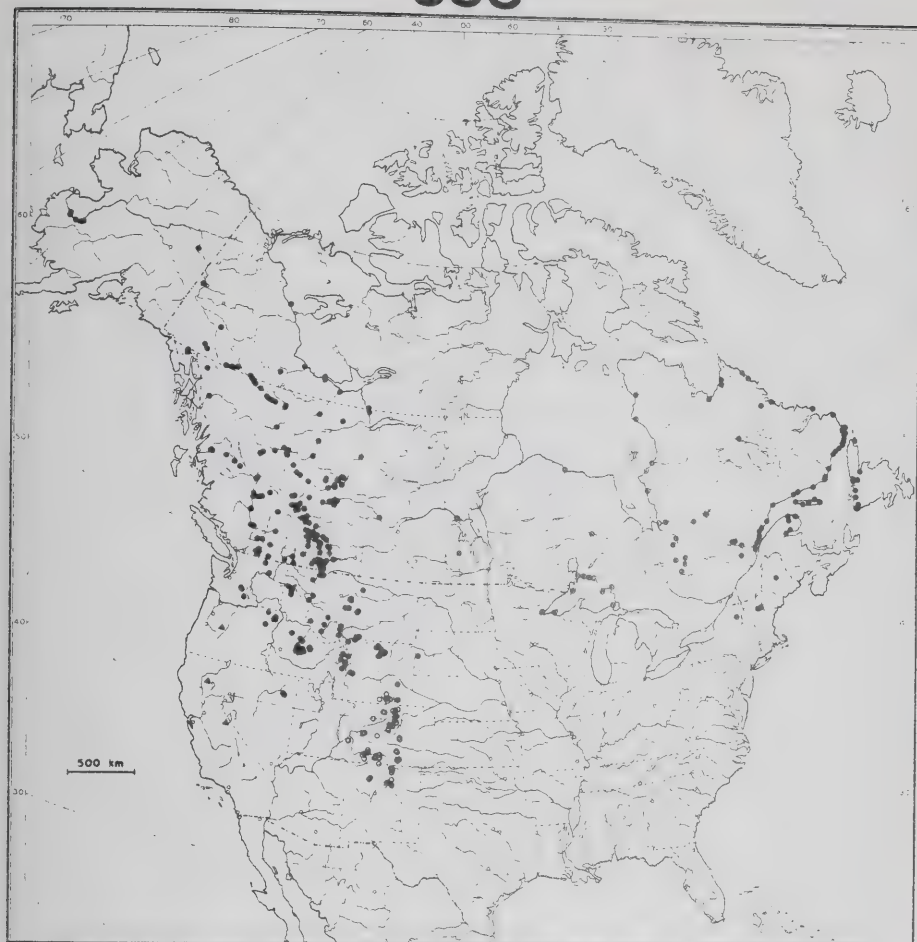
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Figs. 388 - 389. Geographical distribution maps. 388. Nebria
gyllenhali castanipes (Kirby) (solid circles), N. gyllenhali
lassenensis new subspecies (solid triangles), and N. gyllenhali
lindrothi new subspecies (open circles). 389. Nebria frigida
Sahlberg.

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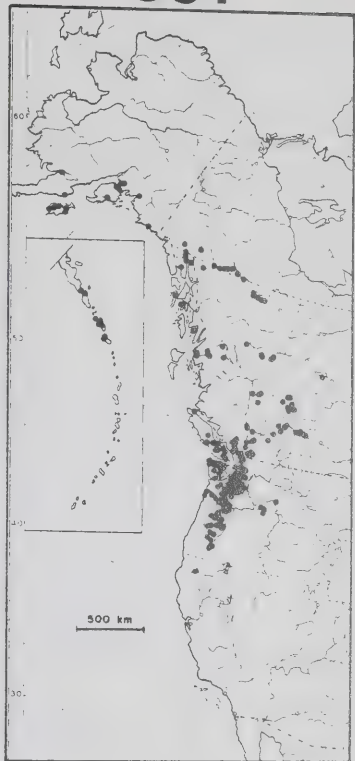
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Figs. 390 - 394. Geographical distribution maps. 390. Nebria acuta acuta Lindroth (solid circles), N. acuta quileute new subspecies (solid triangles), and N. lyelli Van Dyke (open triangle). 391. Nebria sahlbergii sahlbergii Fischer von Waldheim (solid circles), N. sahlbergii modoc new subspecies (open triangles), and N. sahlbergii triad new subspecies (solid triangles). 392. Nebria arkansana arkansana Casey (solid triangles), N. arkansana edwardsi new subspecies (solid circles), N. arkansana oowah new subspecies (open square), and N. arkansana uinta new subspecies (open triangles). 393. Nebria gregaria Fischer von Waldheim (solid circles) and N. charlottae Lindroth (solid star). 394. Nebria fragilis fragilis Casey (solid circles), N. fragilis teewinot new subspecies (open circles), N. zioni zioni Van Dyke (open triangles), and N. zioni oasis new subspecies (solid triangle).

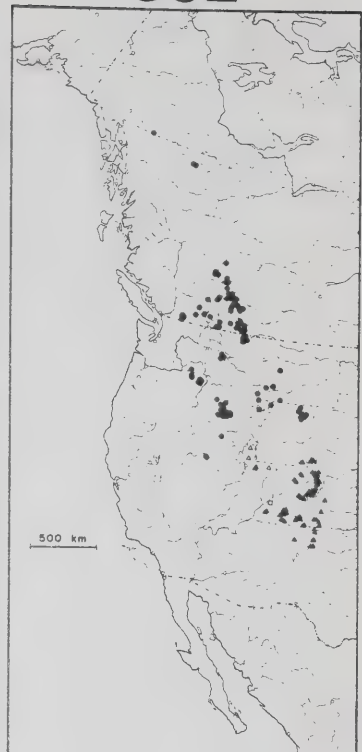
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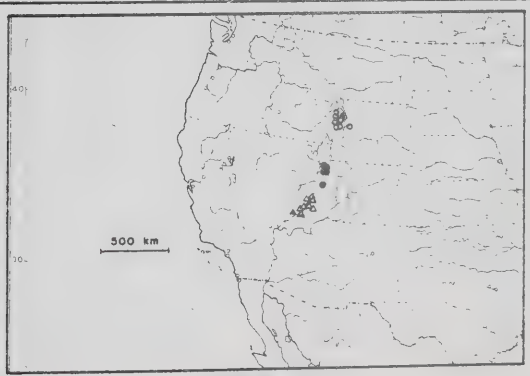
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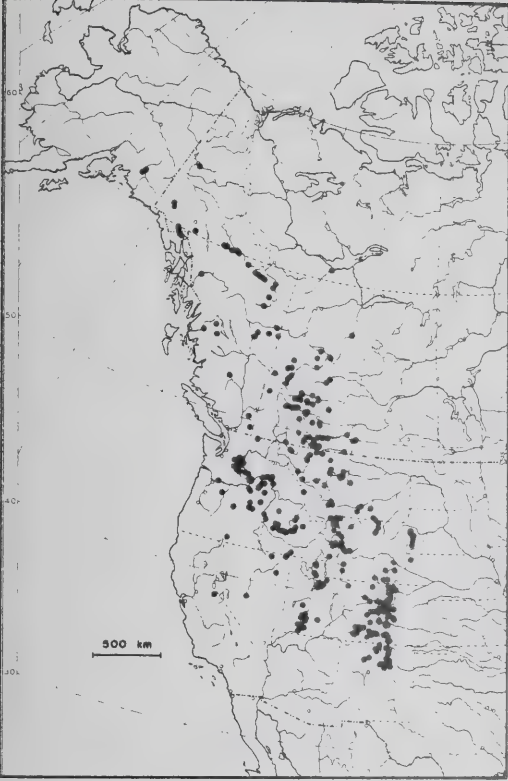
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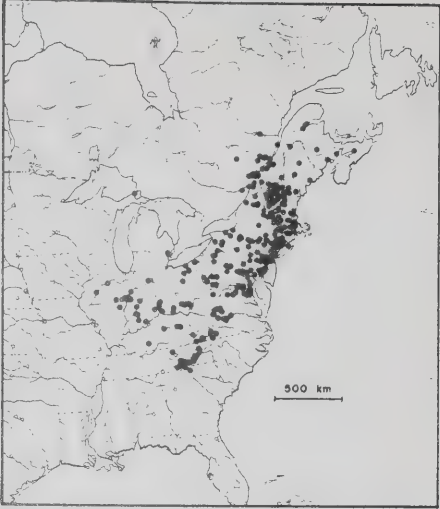
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Figs. 395 - 398. Geographical distribution maps. 395. Nebria obliqua LeConte. 396. Nebria pallipes Say. 397. Nebria appalachia Darlington. 398. Nebria suturalis LeConte; "X" denotes location of deposits yielding N. suturalis fossils.

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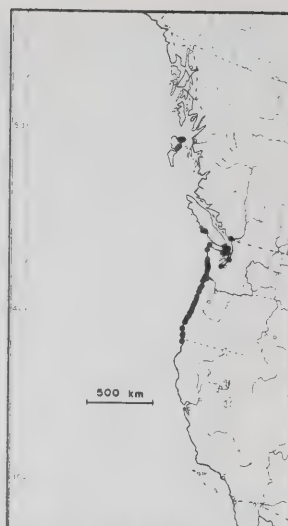
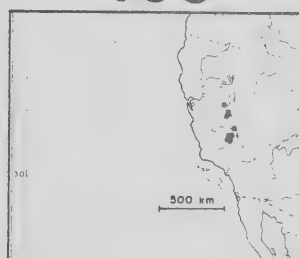
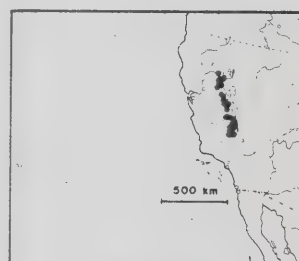
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398



Figs. 399 - 405. Geographical distribution maps. 399. Nebria
mannerheimii Fischer von Waldheim (solid circles) and N. darlingtoni
new species (solid triangles). 400. Nebria eschscholtzii Ménétriés
(solid circles), N. desolata Kavanaugh (open triangles), and N. navajo
new species (solid triangles). 401. Nebria diversa LeConte. 402.
Nebria gebleri gebleri Dejean (solid circles), N. gebleri cascadenis
new subspecies (open triangles), N. gebleri strawberriensis new
subspecies (open square), N. gebleri rathvoni LeConte (solid
triangles), and N. gebleri siskiyouensis new subspecies (solid
squares). 403. Nebria spatulata spatulata Van Dyke (solid circles)
and N. spatulata sierrae new subspecies (solid squares). 404. Nebria
ovipennis LeConte. 405. Nebria kincaidi kincaidi Schwarz (solid
circles), N. kincaidi balli new subspecies (solid triangles), and N.
carri new species (solid squares).

**399****400****401****403****404****402****405**

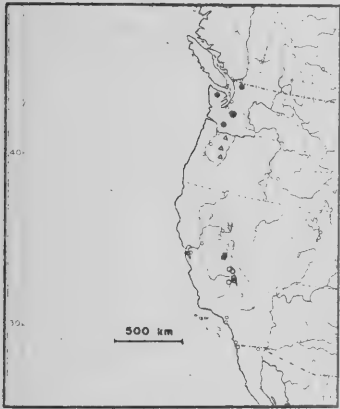
Figs. 406 - 411. Geographical distribution maps. 406. Nebria meanyi meanyi Van Dyke (solid circles), N. meanyi lamarckensis new subspecies (solid triangles), and N. meanyi sylvatica new subspecies (open triangles). 407. Nebria metallica Fischer von Waldheim. 408. Nebria vandykei vandykei Bänninger (solid circles), N. vandykei wyeast new subspecies (open triangles), N. ingens ingens Horn (open circles), and N. ingens riversi Van Dyke (solid squares). 409. Nebria piperi Van Dyke (solid circles), N. schwarzi schwarzi Van Dyke (solid triangles), N. schwarzi beverlianna new subspecies (solid square), and N. purpurata LeConte (open circles). 410. Nebria coloradensis Van Dyke (solid circles) and N. piute Erwin and Ball (solid triangles). 411. Nebria trifaria trifaria LeConte (solid circles), N. trifaria catenata Casey (open triangles), and N. trifaria utahensis new subspecies (solid triangle).



406



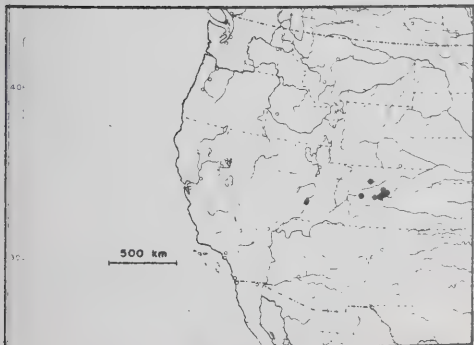
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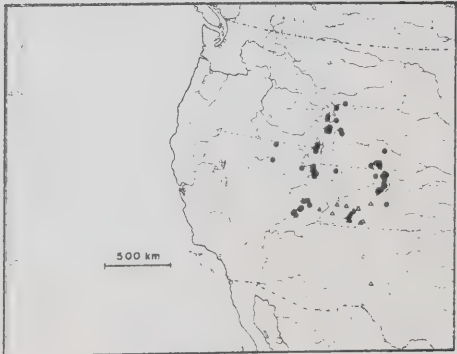
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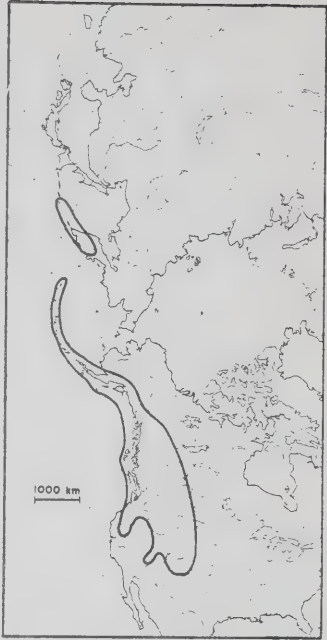
Figs. 412 - 416. Geographical distribution maps. 412. The virescens species group. 413. The paradisi species group. 414. The gregaria species group. 415. The hudsonica species group. 416. The gyllenhali species group.



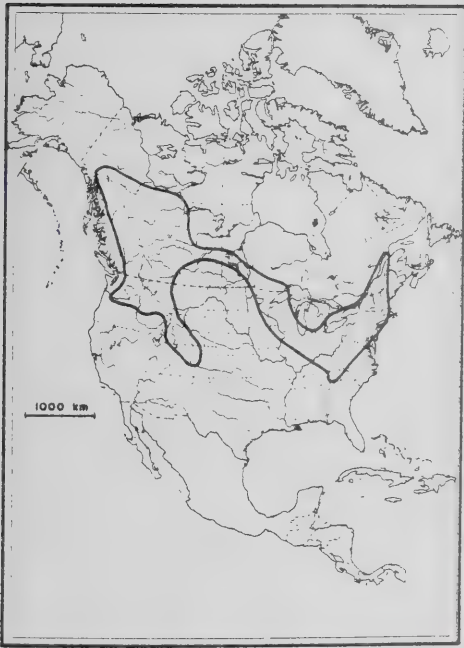
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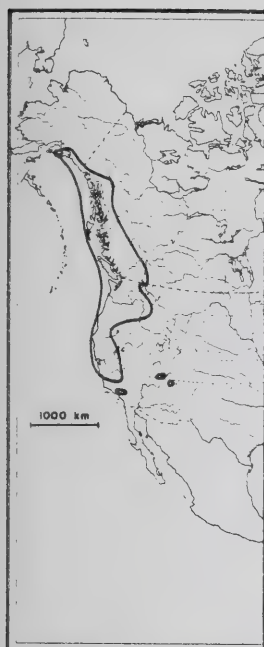


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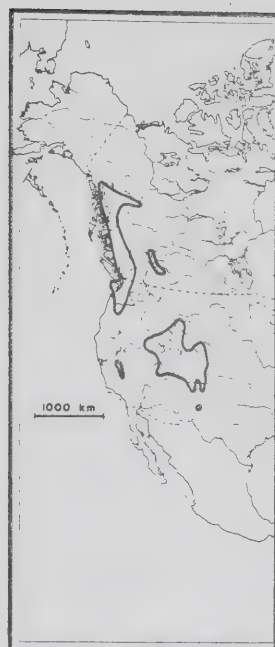


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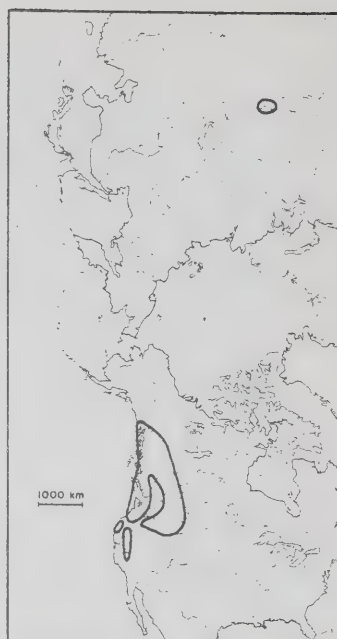
Figs. 417 - 421. Geographical distribution maps. 417. The mannerheimii species group. 418. The trifaria species group. 419. The ovipennis species group. 420. The obliqua species group. 421. The metallica species group.



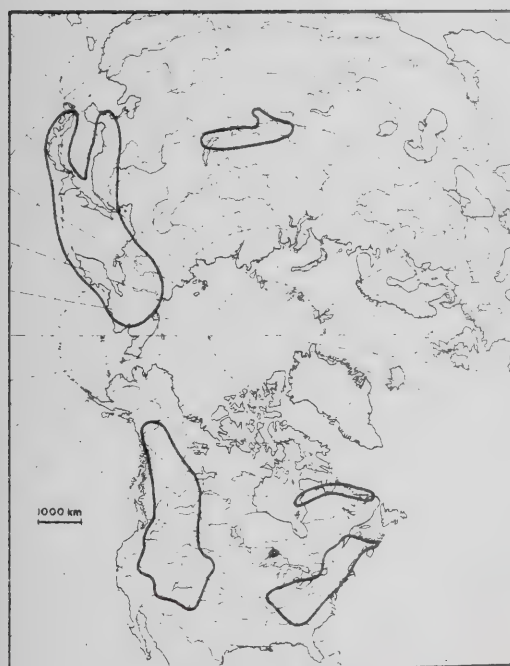
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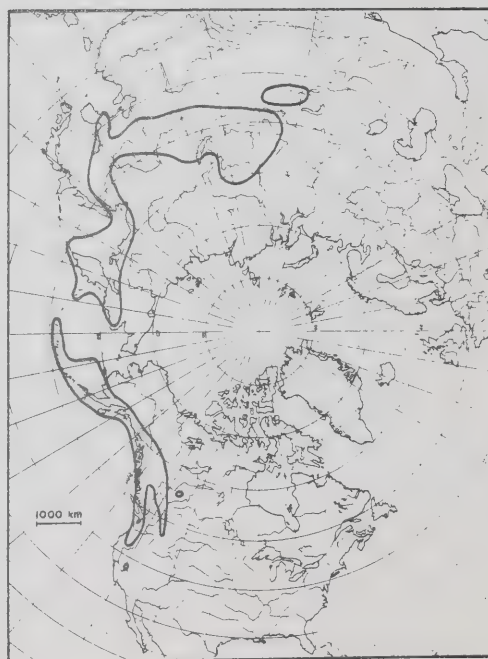
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Fig. 422. Numbers of Nebria species and subspecies represented in 5° latitude and longitude intervals; capital and lower case letters refer to intervals used in Table 16. Fig. 423. Histogram illustrating Nearctic Nebria diversity in relation to latitude. Fig. 424. Histogram illustrating Nearctic Nebria diversity in relation to longitude.

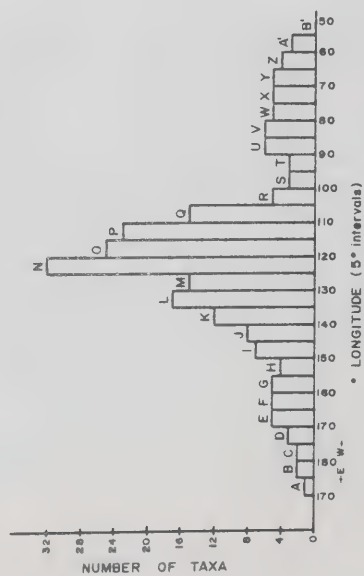
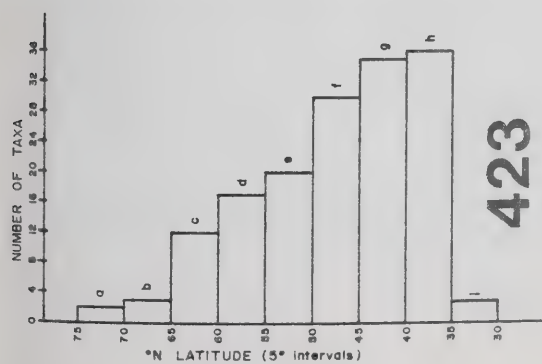
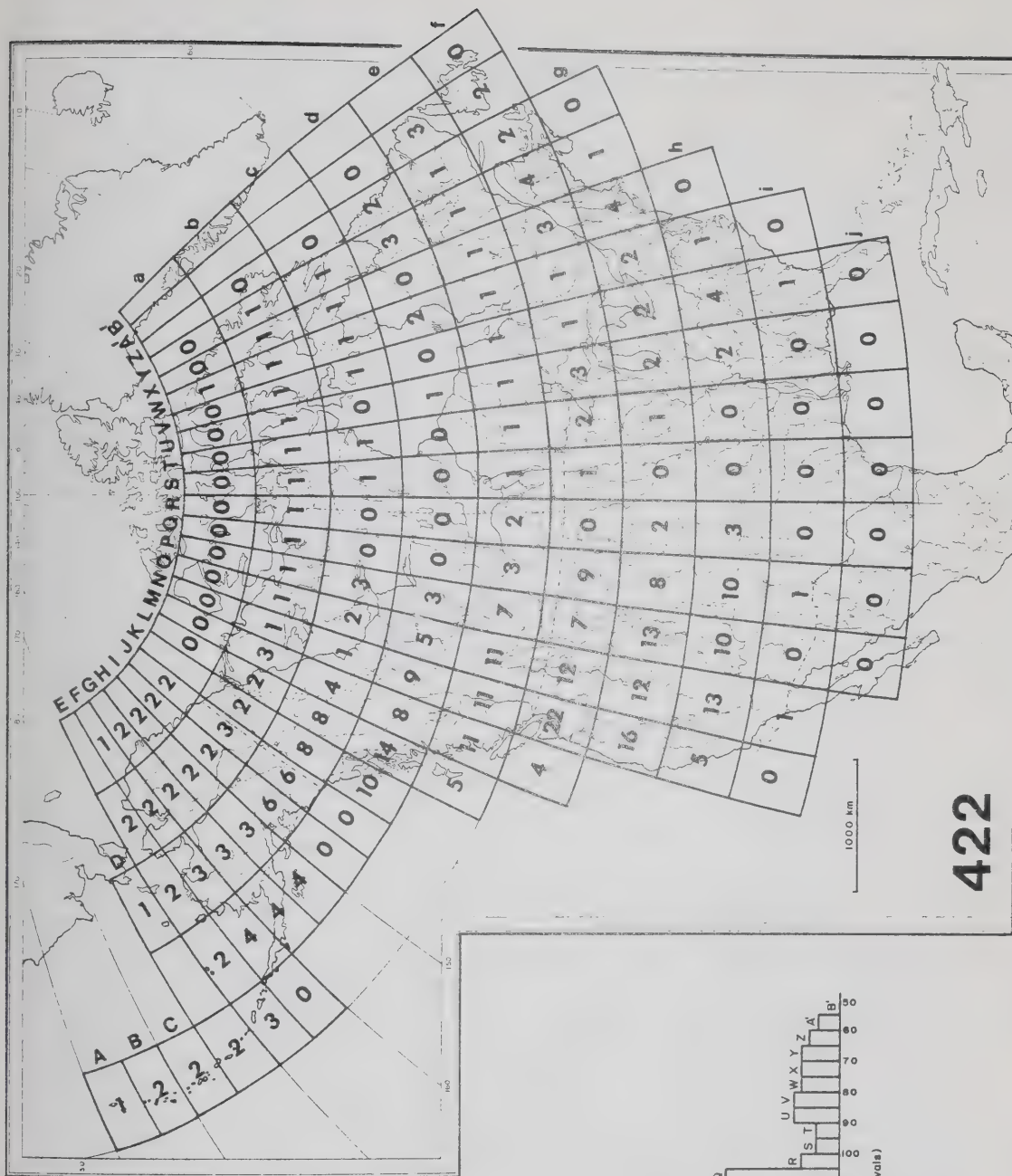


Fig. 425. Centers of endemism among Nearctic species and subspecies of Nebria. Circles are placed around centers of distribution of all taxa for which maximum linear extent of geographical range (= m.e.r.) is 1600 km or less. Radii of circles reflect respective range sizes, except that maximum radius plotted is 250 km (i.e. for all taxa with m.e.r.= 250 km or more, up to 1600 km) and minimum radius plotted is about 50 km (i.e. for all taxa with m.e.r. less than or equal to 100 km). Fig. 426. Diagrammatic representation of Nebria faunal similarities, based on Simpson coefficients (Simpson, 1960), among mountain ranges of the southern and central Rocky Mountain regions and among mountain ranges of the central and southern Pacific Coast regions (see Table 1 for alpha-numeric code used for mountain ranges); lines link only those areas between which coefficients of similarity are greater than or equal to 75. Fig. 427. Same as Fig. 426, but Jaccard coefficients (Braun-Blanquet, 1932) are instead used in similarity measures.

Fig. 428. Mountain systems and ranges of North America (see Table 1 for explanation of alpha-numeric code used). Fig. 429. Principal drainage systems of North America (see Table 3 for explanation of alpha-numeric code used).

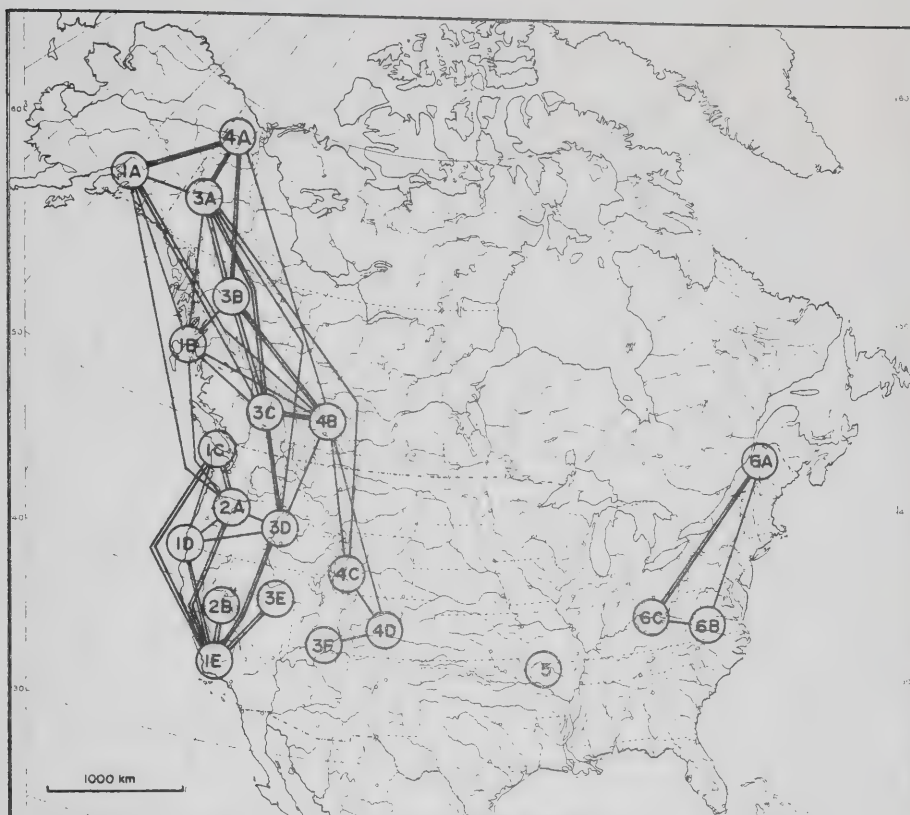


428

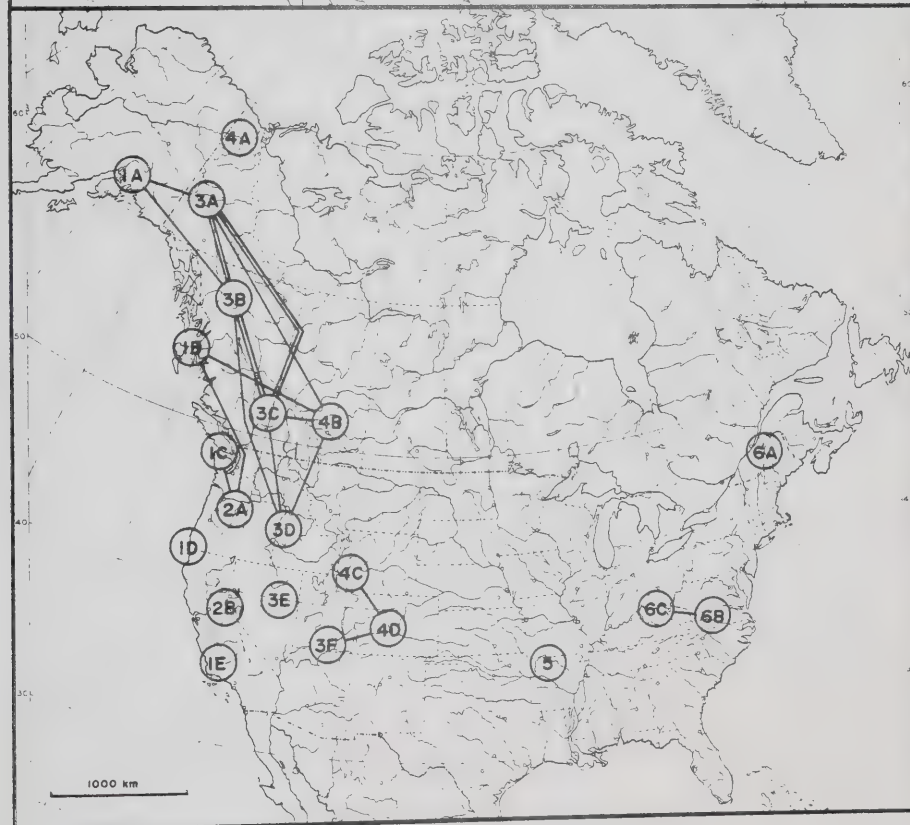


429

Fig. 430. Diagrammatic representation of Nebria faunal similarities, based on Simpson coefficients (Simpson, 1960), among major montane regions (physiographic units) (see Table 1 for alpha-numeric code used for montane regions); single lines link those areas between which coefficients of similarity are greater than or equal to 50; double lines indicate similarity values greater than or equal to 75 between areas linked. Fig. 431. Same as Fig. 430, but Jaccard coefficients (Braun-Blanquet, 1932) are instead used in similarity measures.



430



431



Fig. 432. Eastern geographical range patterns; pattern 1 = line with solid beads; pattern 2 = solid line; pattern 3 = broken line.

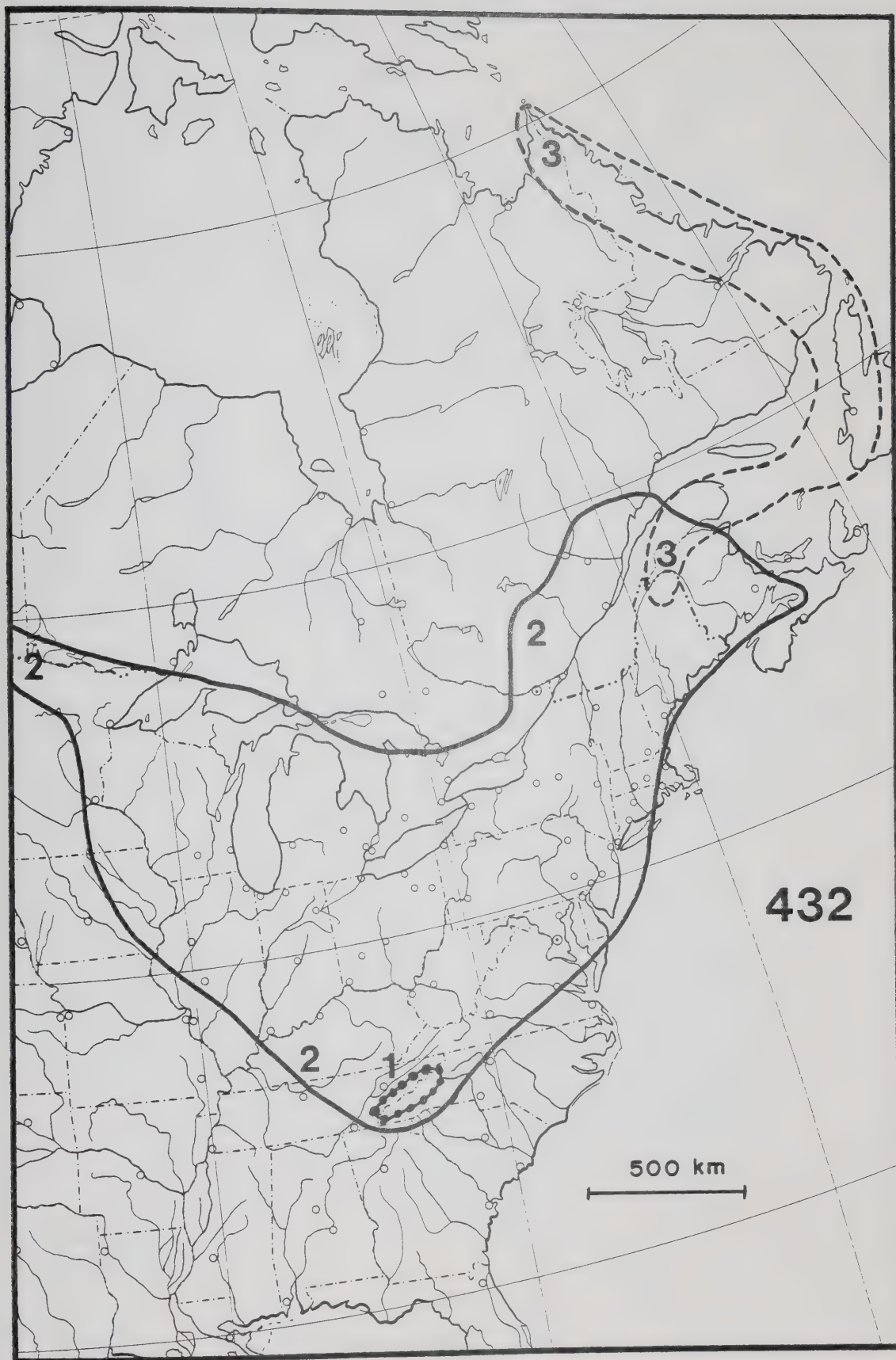




Fig. 433. Rocky Mountain geographical range patterns; pattern 4 = dotted line; pattern 5 = line alternating a single dot with a single dash; pattern 6 = broken (dashed) line; pattern 7 = line of oblique slash marks; pattern 8 = line of small open circles; pattern 9 is not illustrated; pattern 10 = solid line.

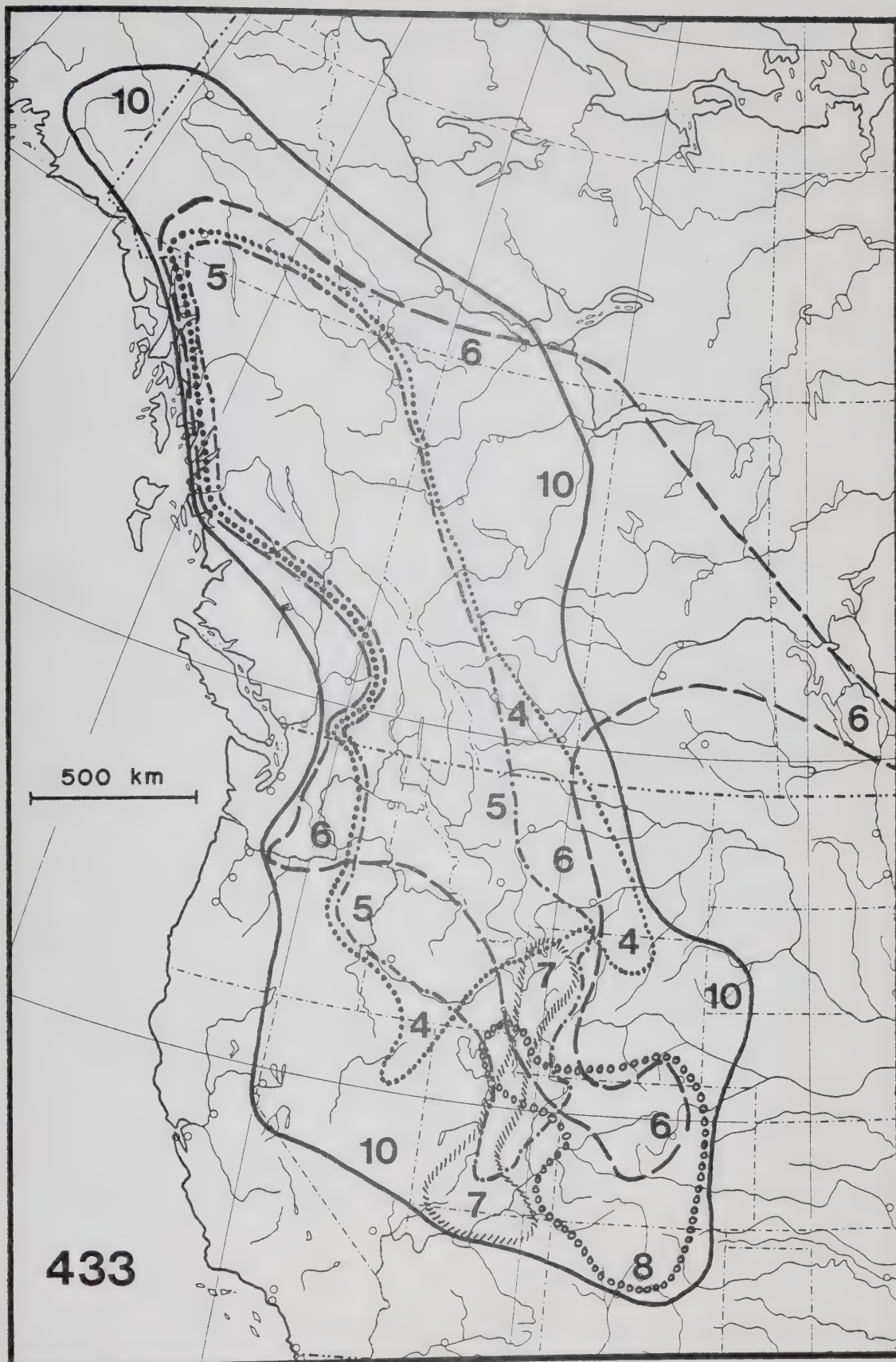




Fig. 434. Pacific coastal geographical range patterns; pattern 11 = line alternating a single dot with a single dash; pattern 12 = line of small open circles; pattern 13 = dotted line; pattern 14 is not illustrated; pattern 15 = broken line of short dashes; pattern 16 = line alternating two dots with a single dash; pattern 17 = broken line of long dashes; pattern 18 = solid line; pattern 19 = line of oblique slash marks.

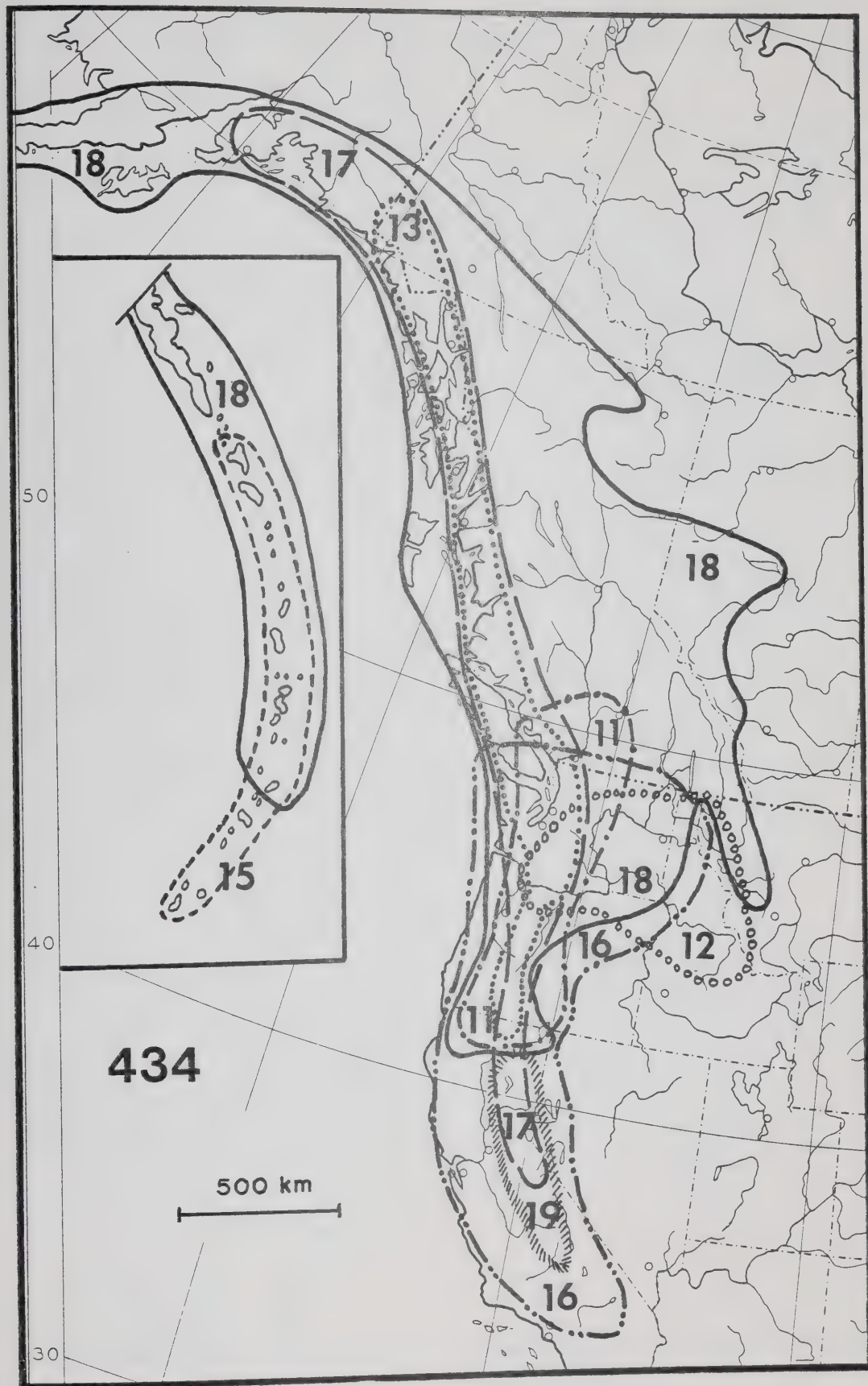




Fig. 435. Northern and transamerican geographical range patterns;
pattern 20 = dotted line; pattern 21 = broken (dashed) line; pattern
22 = line of small open circles; pattern 23 = solid line.

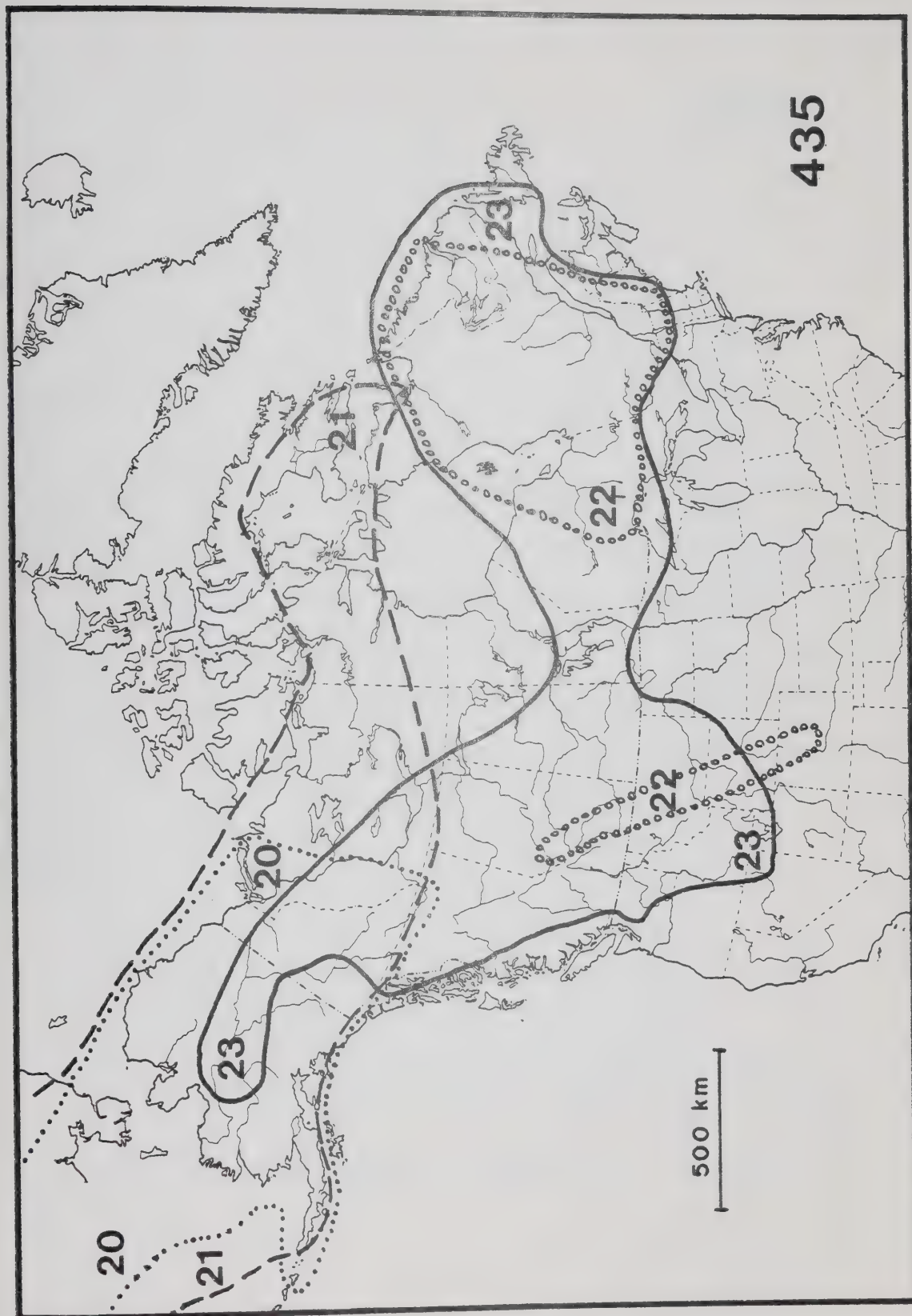
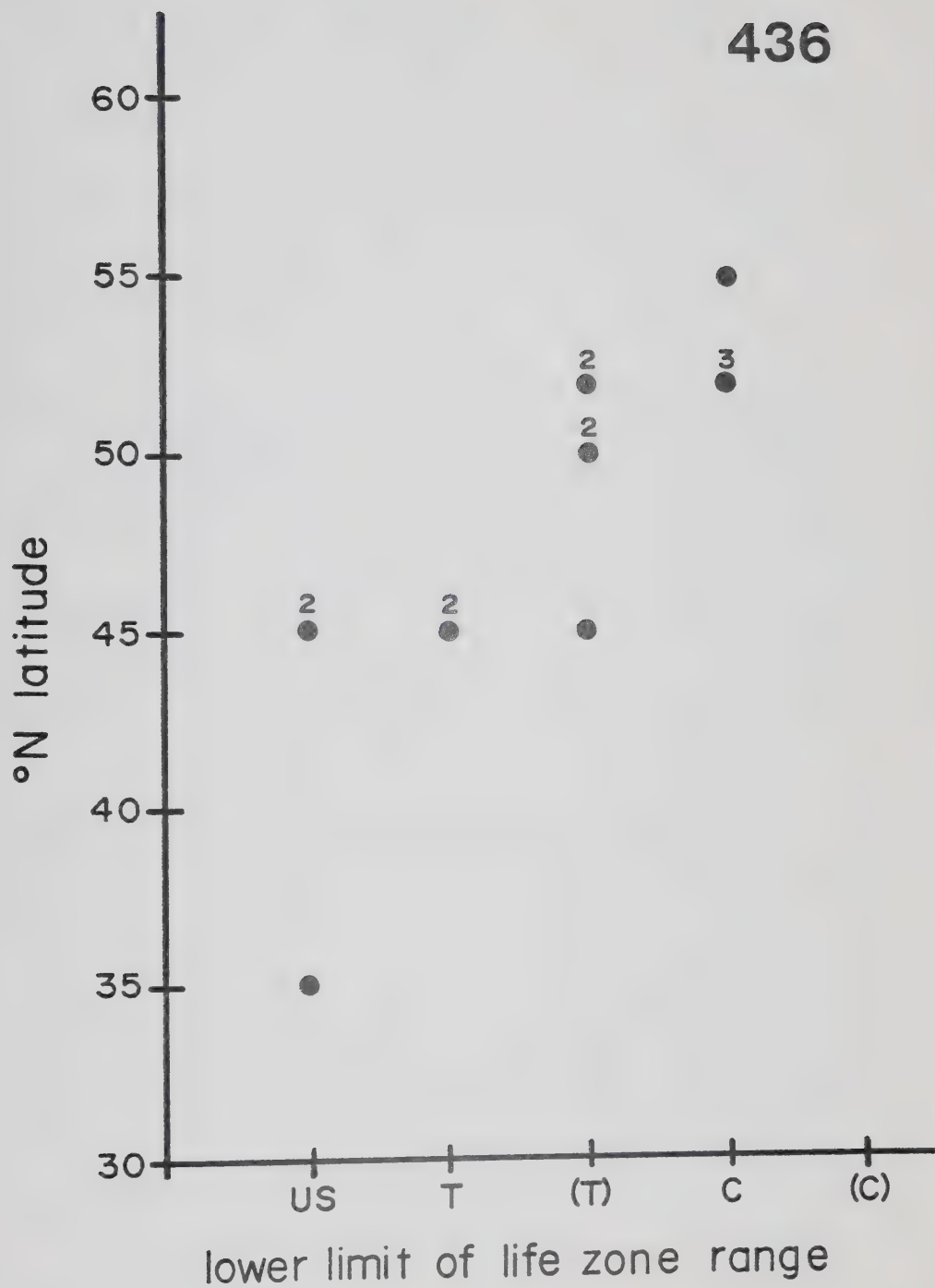


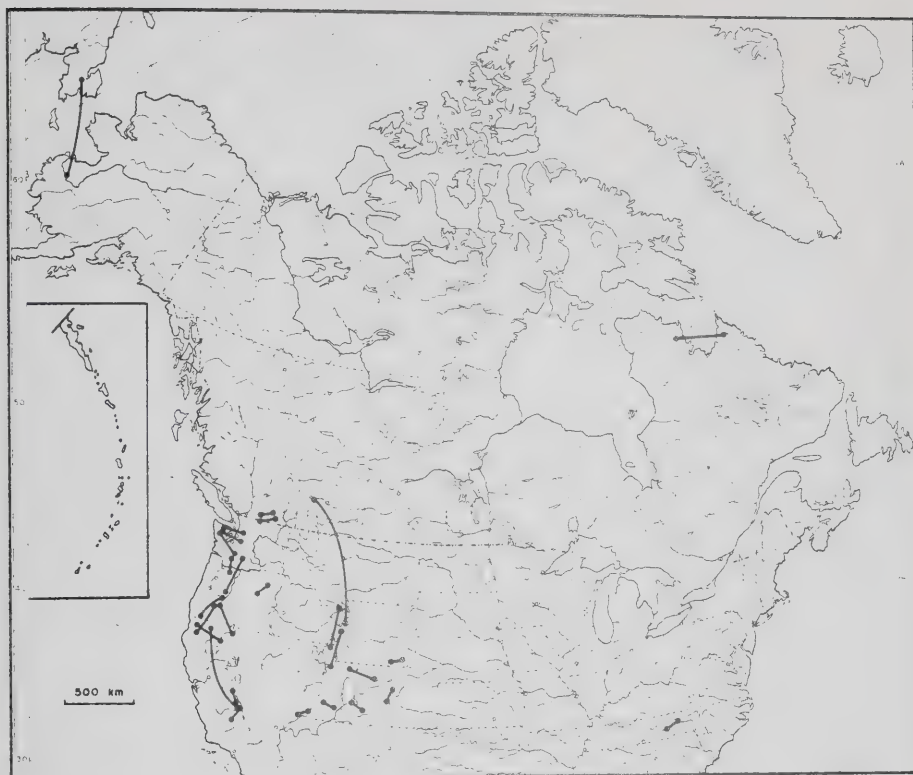


Fig. 436. Scattergram demonstrating relationship between lower limit of macrohabitat range and southern limit of geographical range continuity in taxa common to two different general Nebria faunas.

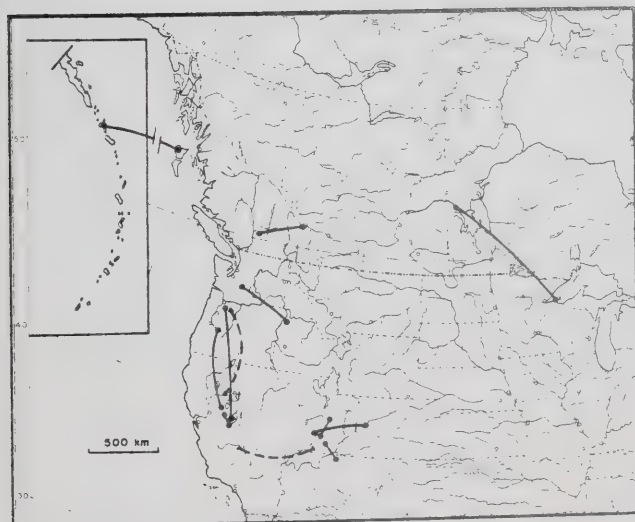
Abbreviations used for life zones are as follows: A/A = Arctic/Alpine Zone; H = Hudsonian Zone; C = Canadian Zone; T = Transition Zone; US = Upper Sonoran Zone. Numbers over dots denote number of records which fall at the same point on the graph.



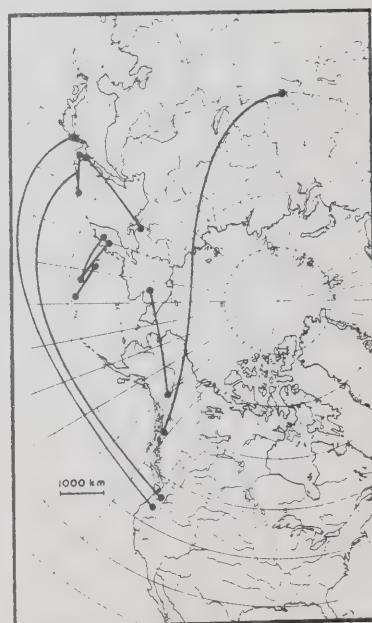
Figs. 437 - 439. Patterns of vicariance. In the following figures, lines connect points which define the shortest distance between respective ranges of vicars (i.e. sister taxa). Fig. 437. Diagrammatic representation of vicariance patterns among Nearctic Nebria subspecies. Fig. 438. Diagrammatic representation of vicariance patterns among sister species (solid lines) or closely related species (broken lines) of Nearctic Nebria. Fig. 439. Diagrammatic representation of vicariance patterns within Nearctic Nebria species groups.



437



438



439

Fig. 440. Relationship between geographical range patterns and vicariance in Nebria subspecies. Range patterns are those illustrated in Figs. 432 - 435 and discussed in the text. Internal vicariance = vicariance within a single recognized range pattern; external vicariance = vicariance between two different, recognized range patterns. N/S and E/W refer to orientation of vicariance (i.e. north/south and east/west, respectively). Numbers indicate number of vicariance relationships which involve a given pattern; and lines indicate range patterns connected by vicariance relationships.

440

Internal Vicariance

External Vicariance



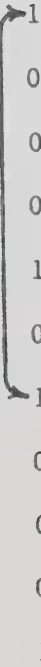
Range					
pattern no.	N/S	E/W	N/S	E/W	
1	0	0	1	0	
2	0	0	1	0	
3	0	0	0	1	
4	0	1	2	1	
5	0	0	1	1	
6	0	0	0	0	
7	1	1	0	0	
8	0	2	1	1	
9	1	1	0	0	
10	0	0	0	0	
11	2	0	0	3	
12	0	0	0	0	
13	0	2	1	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	1	1	0	
18	2	0	0	0	
19	1	1	1	1	
20	0	0	0	0	
21	0	0	0	1	
22	0	0	0	0	
23	0	0	1	1	

Fig. 441. Relationship between geographical range patterns and vicariance in Nebria sister species. Range patterns are those illustrated in Figs. 432 - 435 and discussed in the text. Internal vicariance = vicariance within a single recognized range pattern; external vicariance = vicariance between two different, recognized range patterns. N/S and E/W refer to orientation of vicariance (i.e. north/south and east/west, respectively). Numbers indicate number of vicariance relationships which involve a given pattern; and lines indicate range patterns connected by vicariance relationships.

441

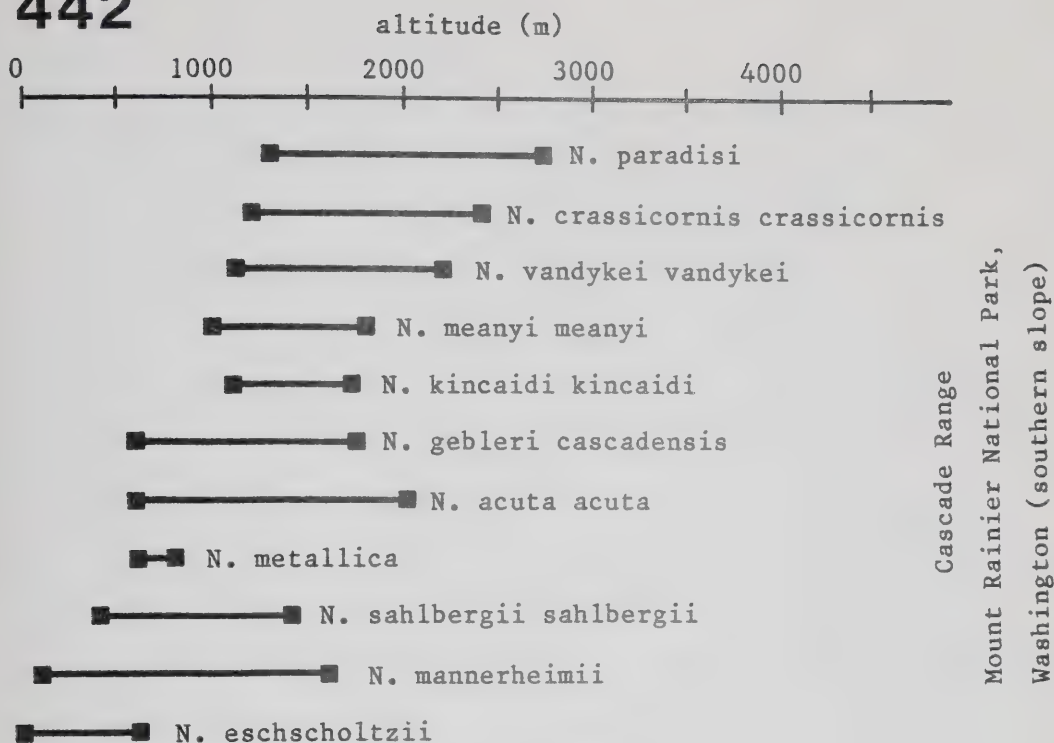
Internal Vicariance

External Vicariance

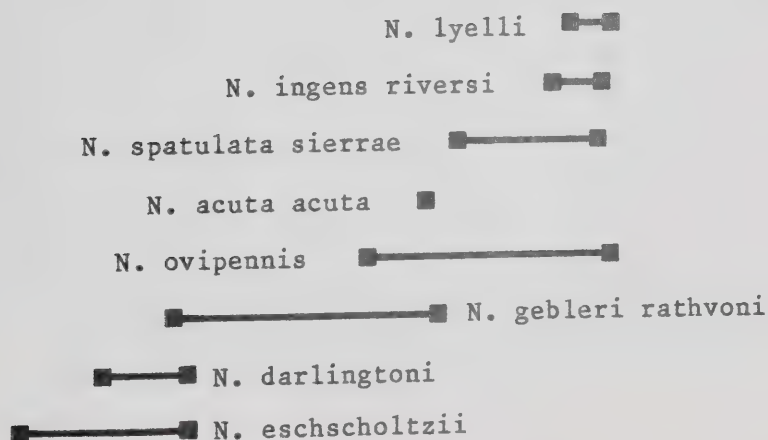
Range				
pattern no.	N/S	E/W	N/S	E/W
1	0	0	0	0
2	0	0	0	1
3	0	0	0	0
4	0	0	0	1
5	0	0	0	0
6	0	0	0	1
7	2	0	0	1
8	0	0	0	1
9	0	0	0	0
10	0	0	0	0
11	0	0	1	0
12	0	0	0	1
13	0	0	0	1
14	0	0	0	1
15	0	0	0	1
16	0	0	0	0
17	0	0	1	0
18	0	0	1	1
19	0	0	3	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0

Fig. 442. Patterns of altitudinal zonation among Nebria taxa in selected mountain ranges. Upper half of figure = Cascade Range at Mountain Rainier (southern slope); lower half of figure = Sierra Nevada at Yosemite National Park (western slope). Line segments represent known altitudinal range of each taxon. Ranges of life zones in each mountain area are plotted below line segments for taxa (abbreviations: A/A = Arctic/Alpine Zone; H = Hudsonian Zone; C = Canadian Zone; T = Transition Zone; and US = Upper Sonoran Zone).

442



T	C	H	A/A
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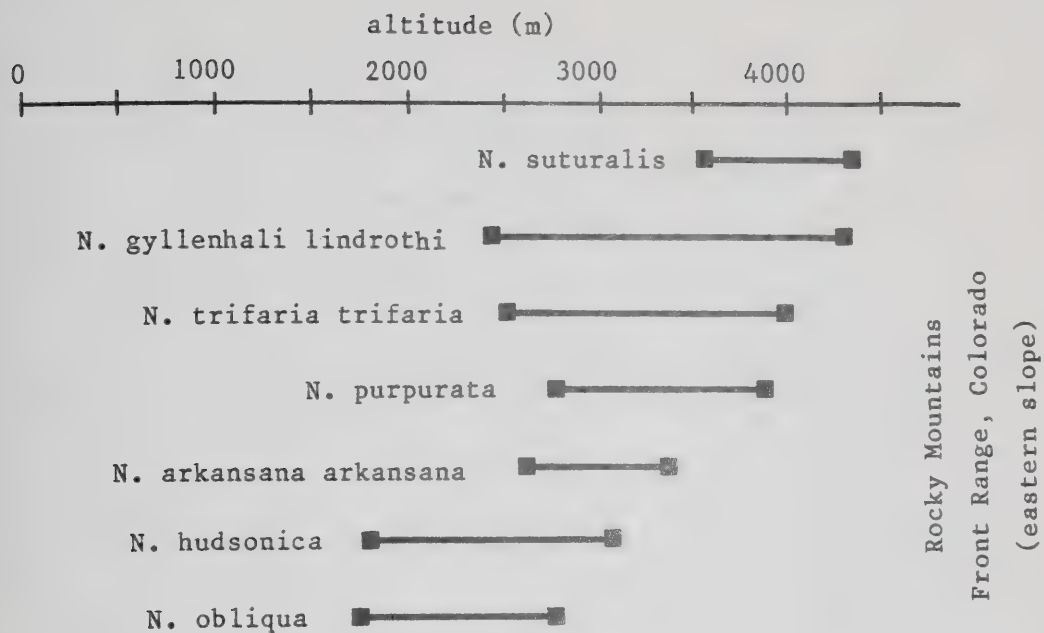
Life
ZoneSierra Nevada
Yosemite National Park,
California (western slope)

US	T	C	H	A/A
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Life
Zone

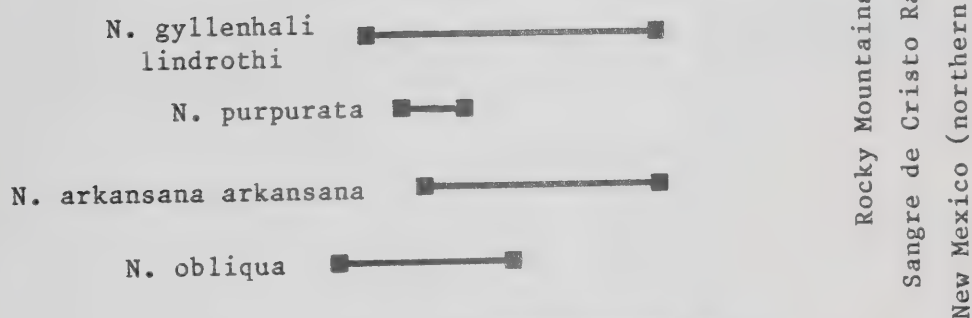


Fig. 443. Patterns of altitudinal zonation among Nebria taxa in selected mountain ranges. Upper half of figure = Rocky Mountains, Front Range, Colorado (eastern slope); lower half of figure = Rocky Mountains, Sangre de Cristo Range, New Mexico (northern slope). Line segments represent known altitudinal range of each taxon. Ranges of life zones in each mountain area are plotted below line segments for taxa (abbreviations: A/A = Arctic/Alpine Zone; H = Hudsonian Zone; C = Canadian Zone; T = Transition Zone; and US = Upper Sonoran Zone).



US	T	C	H	A/A
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Life
Zone



US	T	C	H	A/A
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Life
Zone

Fig. 444. The author conferring with his major professor on a point critical to the project.



"THERE ARE TIMES WHEN I WISH I'D
NEVER STARTED THE THING!"

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